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THE

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FOR 1874.

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EDITED BY

PROFESSOR SIMONDS,

ASSISTED BY

PROFESSORS BROWN AND TUSON, AND G. FLEMING, F.R.G.S.

Ars Veterinaria post medicinam secunda est.—*Vegetius.*

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THE

VETERINARIAN.

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Communications and Cases.

THE EFFECTS OF THE FOG ON CATTLE IN LONDON.

It is not necessary to expatiate on the qualities of those dense mixtures of non-respirable gases which have rendered our metropolis famous from time immemorial. All that can be said about a London fog has been said over and over again, but withal, until our late experience showed us what are the possible effects of vitiated atmosphere on animal life, fog was not looked upon as a deadly mixture destructive to animal life.

Our readers will have heard a good deal already about the terrible disturbance which was caused at the last show of the Smithfield Club by the sudden occurrence of a dense fog during a sharp frost. On several occasions during the last seventeen or eighteen years heavy fogs have occurred during the Cattle Show week, but no serious mischief resulted therefrom, and, therefore, no great apprehension was felt when the atmosphere became dense and pungent on the second day of the Show of 1873.

However, before the fog had continued for many hours some of the cattle in the Agricultural Hall evinced palpable signs of distress. The short-horns were the first to suffer, and the unfortunate predisposition of this breed to suffer under the influence of exciting cause of disease was evident throughout.

On Tuesday, the first day of the fog, as early as eleven o'clock in the morning several animals were marked as affected with difficult breathing. No abatement of the fog

took place during the day; on the contrary, towards evening it became rather worse, and the majority of the cattle in the Hall showed evidence of suffering from its influence.

Sheep and pigs did not however experience any ill effect from the state of the atmosphere either then or during the remaining time of the Show.

On Wednesday there was very little improvement in the atmospheric condition, and a large proportion of the cattle were so much distressed that it became necessary to do something to satisfy the exhibitors, if not to relieve the animals. Accordingly, the beasts which were most affected were taken into the entrance yard, and, subsequently, outside the gates, for what has been ironically termed an "airing;" if "fogging" is a legitimate word, it would be far more expressive. Stimulants, consisting of aromatic spirit of ammonia and æther, were given in several instances to rouse the failing energies of those beasts which seemed to be most exhausted, but of course anything like a consistent plan of treatment which a practitioner would have carried into effect in individual cases was out of the question under the peculiar circumstances of the outbreak.

During Wednesday night ninety-one cattle were removed from the Hall for slaughter.

On Thursday the atmospheric conditions were improved, and no fresh attacks were recorded. On Friday the air was comparatively clear, and all the animals which remained in the Hall were in good sanitary condition.

While the hurry and excitement continued, and in the presence of the visitors, there was little opportunity of making any minute investigations; we ascertained, however, that while the cattle appeared to be suffering from asphyxia, there was an elevation of the internal temperature to 103—105°. Mr. Priestman and Mr. Rayment, whose reports we include in this account, also observed this fever symptom in the animals which they examined.

The *post-mortem* appearances were indicative of bronchitis; the mucous membrane of the smaller bronchial tubes was inflamed, and there was also present the lobular congestion and emphysema which belong to that disease. Mr. Priestman reports as follows respecting the cases which occurred in his practice:

15*th December*, 1873.

Dear Sirs,—I enclose you particulars of *urgent* cases I was called to attend on Tuesday and Wednesday last suffering from the effects of the fog:

District.		No. of Cows in shed.	No. affected.	Result.
Islington,	1	18	2	Convalescent.
,,	2	45	7	,, ,,
,,	3	37	2	1 slaughtered.
,,	4	8	1	Convalescent.
,,	5	4	1	,, ,,
St. Pancras,	1	12	1	,, ,,
Marylebone,	1	20	3	,, ,,
Bloomsbury,	1	13	1	,, ,,
Haverstock Hill,	1	25	3	,, ,,
Dalston,	1	60	6	,, ,,
,,	2	7	2	Slaughtered.
,,	3	8	1	,, Neither treated.
Shoreditch,	1	8	2	Convalescent.
Haggerston,	1	16	2	,, ,,
Hoxton,	1	20	6	,, ,,
Clerkenwell,	1	28	3	,, ,,
Aldersgate, City,	1	18	3	1 died.
,, ,,	2	13	2	Convalescent.
		360	48	

No. 1, Islington, was the first and only shed I was called to on the 9th instant, at 10.30 p.m. I found two cows suffering from difficult breathing, with a temperature of 104°.

I administered ten drops Tinct. Aconite with half dram Nitrate Potash in a pint of cold water, and left a similar dose to be given early next morning. Ordered doors and windows to be closed, and the gas to be burnt during the night.

When I visited them at 8 a.m., following day, I found a marked improvement, although the fog was equally dense.

During Wednesday, the 10th, I had seventeen other applications, and adopted the same treatment in every instance.

On Friday, the 12th, I found most of my patients convalescent.

The majority of the animals were in good marketable condition (for slaughter), having been in the sheds some months; the remainder were fresh calved, and in full milk.

Finding subcutaneous emphysema in one case on the 10th, I carefully examined every other, but found only four animals so affected. Although I was very apprehensive of a fatal result in two of the cows which exhibited this symptom, I am pleased to say that they are in a fair way of recovering, as also

another which was less affected. One which was slaughtered was in the same emphysematous condition.

We have only to add that a microscopic examination of the milk and blood of diseased animals did not lead to the discovery of any morbid products, nor did any indications of blood-poisoning follow the inoculation of three animals (a rabbit and two guinea-pigs) with the blood of one of the oxen which was in a sinking condition when slaughtered.

Mr. Priestman also informed us that there was a marked deficiency in the yield of milk in those districts in which the fog was most dense, and that one cow in particular suddenly lost nearly half the quantity which she yielded in health; the loss in every case, however, was only temporary.

Mr. Rayment, the inspector of the Metropolitan Market, reports as follows:

On the morning of the 10th instant my attention was directed to an ox in the lairs breathing with great difficulty, and evidently much distressed. I examined the animal, and found a temperature of 103°. On my suggestion it was slaughtered, and the *post-mortem* examination showed the lungs to be in a state of emphysema; no other morbid lesions were apparent.

During this and the following day forty beasts from the Agricultural Hall were dressed in the slaughter-houses attached to the market. Some were brought in alive, presenting a similar appearance to the one in the lairs in the morning; others had been killed on the road to the market.

In all, the lungs were in a state of emphysema, and in several this emphysematous condition existed beneath the peritoneal covering of the kidneys; in one ox in particular it existed beneath the pleuræ costales, especially just under the muscular portion of the diaphragm. In the lungs of some, patches of congestion were noticed, and the mucus in the bronchial tubes was quite black.

I examined several with the thermometer, and found a temperature of 103° Fahr., and in one heifer a temperature of 106°.

In the market on the 11th several beasts exhibited similar symptoms to those brought from the Hall.

Weather during these two days and the previous one intensely foggy, with sharp frosts.

FURTHER RECORD OF EXPERIMENTS OF BLOOD-POISONING.

(*Continued from* vol. xlvi, p. 815.)

The record of the experiments on blood-poisoning, published in our December number, comes down to November the 26th, on which day two guinea-pigs are reported as having died *thirty-six hours after being inoculated*, one with the blood of a previously inoculated guinea-pig and another with that of a rabbit (No. 2).

Nov. 26th.—Inoculated a rabbit (No. 3) with blood of the guinea-pig which died this morning—two needle punctures, one on the inner side of each thigh. Rabbit died in convulsions *twenty-eight hours after inoculation.*

With the exception of not taking its food with the same activity as before the inoculation, no indications of ill health were observed until about an hour before its death, when the breathing became much embarrassed, and cerebral symptoms set in. An examination of the blood showed the presence of bacteridies in great abundance.

Within ten minutes of the death of the rabbit (No. 3), a fine young goat was inoculated with its blood on the inner part of each thigh—two needle punctures.

28th.—Animal apparently unaffected.

29th.—Symptoms of blood-poisoning well marked. Animal refuses all food; is remarkably dispirited; keeps in a recumbent position. Pulse numbers 130 and the respiration 110 per minute. *Died at 3 p.m., forty-seven hours after inoculation.* Shortly before death the inoculated spots assumed a livid hue.

An examination of the blood was made *after the declaration of symptoms of ill heath, and prior to death, when numerous bacteridies were to be seen.*

Two cats and two dogs were fed with the flesh of the goat on December 1st, 2nd, 3rd, 4th and 5th, but no ill effects followed in either case. The flesh was bright in appearance and firm, and gave no naked-eye indications of the cause of death.

Nov. 28th.—Inoculated a cat with blood of rabbit (No. 3), two punctures, one at the base of each ear.

29th.—Examination of the blood in the morning *showed the presence of a large number of leucocysts.* These had apparently greatly increased when the blood was examined in the evening. No constitutional effects. A similar examination

of the blood down to Dec. 2nd showed, with slight variations only, a *still augmented quantity of white cells, but no bacteridies were detected on either occasion.* Throughout, the cat, with the exception of being less playful than usual, did not exhibit any symptoms of constitutional suffering.

Nov. 29th.—Inoculated a donkey with blood of the goat—three punctures—one near to the nostrils, the others on the inner side of the ear-flap.

30th.—No apparent effect. Animal feeds well. The pulse numbers 44, and the respirations 9 per minute. Blood normal.

Dec. 1st.—Marked indications of ill health manifested themselves towards noon. The pulse became quick, but feeble; the breathing rapid and the countenance anxious. Temperature $101\frac{5}{10}$ths.

The animal also loathes food, and shows great disinclination to be moved.

Blood loaded with leucocysts. No bacteria nor bacteridies to be detected.

2nd.—Little change. Blood in same condition as yesterday. Towards evening the severity of the symptoms abated.

3rd.—Animal convalescent. Blood returning to normal condition as to proportion of white cells.

Dec. 2nd.—Inoculated a guinea-pig with some blood of the goat, *which previously to being used was subjected to a moist heat of 212° Fahr.*

3rd and 4th.—No apparent effect.

5th.—The animal died suddenly, *sixty-eight hours* after inoculation. The blood was examined immediately after death, and found to contain bacteridies in enormous quantities.

As a counter experiment, a guinea-pig was inoculated with blood of goat rendered solid by *dry heat.* No effects followed.

Another guinea-pig was also inoculated on Dec. 3rd, with blood of goat in its ordinary condition—one puncture. The animal died *about thirty hours* after inoculation. In this case bacteridies were present in large numbers in the blood after death.

These experiments show the easy transmissibility of blood diseases by inoculation from animal to animal of different species, as well as the deadly character of such affections; but beyond the establishment of these facts it would not at present be safe to hazard any conjectures.

REMARKS ON THE CLASSIFICATION OF ANIMAL PARASITES.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S.,
Professor in the Royal Veterinary College.

At one of the meetings of the Court of Examiners of the Royal College of Veterinary Surgeons it was recently suggested that, in consequence of the interest now taken by members of the profession generally in the subject of Parasites, it would be desirable to publish an outline of the classification of the parasites of our domesticated animals similar to that which I have been in the habit of explaining to the students attending the lectures at the Royal Veterinary College. It was also remarked that such an outline would prove a useful supplement to the 'Manual of Parasites' issued from *The Field* office, since the volume in question is, for the most part, limited to the intestinal worms. At the eleventh hour I hasten to comply with this very reasonable request, but I must ask the indulgence of critics in respect of a task which is by no means so simple as many might suppose. The classification of parasites on strictly scientific and zoological principles—if absolute accuracy of detail be required—is involved in almost insuperable difficulties.

Professor Simonds, in his well-known "Observations on Parasites and Parasitic Diseases," published in the *Journal of the Royal Agricultural Society* for 1865, adopted the plan of dividing the group into three classes, termed respectively *Epizoa*, *Ectozoa*, and *Entozoa*. A similar basis of arrangement is given in the admirable "Histological Demonstrations" published by Professors Brown and Harley.

The only objection to this plan lies in the imperfect definition as between *Epizoa* and *Ectozoa*, and more especially also in the fact that the term *Epizoa* has long been used by zoologists to characterise a peculiar and distinct group of parasitic creatures which attach themselves to fishes (Lernæidæ, Pycnogonidæ, &c.).

Without discussing this part of the question further, and without, for the present, attempting to offer more accurate definitions of the various kinds of parasitism than are to be found in those that have hitherto been put forward, I submit the following. It is given, however, with the distinct request that it may be regarded merely as a

practically convenient and provisional arrangement. I wish it also to be distinctly understood that the various groups here named are not necessarily of equal zoological value. Some of them happen to be nearly, if not precisely, the equivalents of each other; whilst others, again, cannot be so regarded.

First group (all Entozoa). TREMATODA.—This order of internal parasites comprises the Flukes. The title implies that the animals exhibit *perforations*. The old naturalists looked upon the suckers displayed by these creatures as holes or openings. Hence the term, from the Greek word (*trema*, a pore).

Examples:—*Fasciola hepatica*, *Distoma lanceolatum*, *Amphistoma conicum*, &c.

Second group (all Entozoa). CESTODA.—This comprises the tapeworms, and also, strictly speaking, the bladder-worms or cystic Entozoa of the old authors (Cystica). The Greek word *kestos* means a band or girdle; hence the ordinal equivalent term above given. The bladder-worms, including hydatids, measles, &c., are the larval stages of growth of various tapeworms.

Examples:—*Tænia expansa*, *T. mediocanellata*, *T. plicata*, *T. perfoliata*, *Bothriocephalus latus*, &c.

Also, of the larvæ:—*Cysticercus tenuicollis*, *Cyst. bovis*, *C. ovis*, *Cœnurus cerebralis*, *Echinococcus veterinarum*, &c.

Third group (all Entozoa). NEMATODA.—Comprises the lumbricoid or round worms, and also the thread worms; the term deriving its origin from the Greek word *nema*, signifying a thread. It likewise includes the strongles, the term *strongulos* meaning round or cylindrical.

Examples:—*Ascaris lumbricoides*, *A. megalocephala*, *A. marginata*, *A. mystax*, *Strongylus micrurus*, *Str. filaria*, *Trichina spiralis*, *Filaria papillosa*, and various other species belonging to the genera respectively called *Spiroptera*, *Trichocephalus*, *Oxyuris*, *Sclerostoma*, *Onchocerca*, &c.

Fourth group (all Entozoa). ACANTHOCEPHALA.—This title embraces a small series of parasites, which, to the naked eye, very closely resemble the nematode worms. They differ, however, essentially; being, as the term indicates, furnished with spine-covered heads. In other words, they are the

thorn-headed worms (from *Acanth*, a spine). These parasites abound more particularly in fishes and reptiles.

Example:—*Echinorhynchus gigas*. This Entozoon infests the hog, and is the only species of interest to the veterinarian.

Fifth group (mostly Ectozoa). ARACHNIDA.—This great class of articulated, jointed, or, more strictly, arthropodous animals includes within it a variety of parasites. These may be spoken of as Arachnidans. The mites and true ticks, and such like creatures, belong to this group.

Examples:—*Pentastoma tænioides* (an internal parasite), *Ixodes bovis*, *Dermatodectes bovis*, *Symbiotes bovis*, *Acarus*, *Sarcoptes*, &c.

Sixth group (both Ectozoal and Entozoal in character). INSECTA.—The insects, properly so called (that is to say, arthropodous, or jointed-limbed and non-vertebrated creatures with six legs), are many of them essentially parasitic in their habits. The most important of these are the bots, other larvæ and maggots of various flies, as well as the varieties of lice.

Examples (lice):—*Hæmatopinus equi*, *H. vituli*, *Trichodectes latus*, *Trich. scalaris*, *T. ovis*, *Melophagus ovinus* (not a true tick, although commonly called the sheep-tick), &c. (bots, flies, maggots, &c.), *Æstrus bovis*, *Æstrus equi*, *Æstrus ovis* (these being sometimes placed under the genera *Hypoderma*, *Gasterophilus*, and *Cephalæmyia* respectively); also *Glossina*, *Tabanus*, *Chrysops*, *Asilus*, &c.

Seventh group (chiefly Entozoal). PROTOZOA.—This great series of minute organisms contains a number of parasitic creatures of very low organization. For the present, it is not desirable to hazard statements respecting their true zoological position, further than is implied by the fact of their being placed in the lowest most primary division of the animal kingdom.

Examples:—*Psorospermiæ* (the so-called cattle plague bodies), *Gregarinæ*, *Bacteria*, &c. For some of these I propose to apply the generic titles of *Hesslingia*, *Gubleria*, *Lindermannia*, &c., according to the names of their various discoverers.

LARVA OF THE HELOPHILUS, AN EQUINE PARASITE.

By Assistant-Professor J. Wortley Axe.

In October, 1872, an aged chestnut gelding was admitted into the College Infirmary suffering from intense irritation of the skin. As the cause of the malady was somewhat obscure, parasites were sought for from time to time, and on several occasions during his stay at the College large numbers of long, white, slender bodies were found projecting from the anus. This led to several horses then in the College Hospital being examined, when it was observed that similar bodies were mingled occasionally with the fæcal evacuations of some of them.

Since then, and especially during the past autumn, I again observed very many of these organisms in the fæces and about the anus of some of the infirmary patients.

On examination they were found to be the larvæ of a variety of Helophilus one of the order of dipterous insects. On removing them from the grasp of the sphincter they evinced considerable toughness and elasticity, and when placed in water feeble movements were observed. I am not aware that any English or Continental entomologist or parasitologist has referred to this creature as an equine parasite, and if such be the case, the life-history of the Helophilus presents a new phase, and becomes a matter of high interest to the veterinarian. Réaumur, whose observations on the larvæ of the Helophilus are highly interesting, termed them *vers á queue de rat*, and in this country they are commonly known as rat-tailed maggots. The specimens obtained by me vary between three and four inches in length. The head is large, and from it the body gradually tapers, and ends in a very long, slender tail. Réaumur describes the tail as consisting of two tubes, one contained within the other, after the manner of a telescope; its terminal extremity is rounded and perforated by two openings or breathing pores, and surrounded by several small tufts of hair. He also noticed that when in water the bodies of the larvæ were maintained in a perpendicular position, with the extremities of their tails resting upon the surface, and as the depth of the water was increased, that their tails became elongated to twice their ordinary length. This, with other peculiarities, led Réaumur

to regard the tail as a respiratory tube, which could be elongated or shortened according to circumstances.

It appears that after passing a certain period of their life in water, the larvæ of the Helophilus bury themselves in the earth, when the skin becomes dry and hard and their worm-like character destroyed. Indeed, they then assume the pupa-form, from which they subsequently emerge as winged insects. The form and manner in which they are introduced into the body of the horse, as well as the changes which take place during their parasitic life, are subjects for future investigation.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from* vol. xlvi, *p.* 825.)

As any remarks upon the Poppy will be incomplete without some description of its main product *Opium*, we shall occupy this chapter with a short account of the preparation, composition, and uses of this most important drug which, according to Dr. Pereira, is collected in India in the following manner:—

"At about three or four o'clock in the afternoon individuals repair to the fields and scarify the poppy capsules with sharp iron instruments called mushtars. The mushtar consists of four narrow bars of iron, each of which is about six inches in length, and of about the thickness of the blade of a penknife. At one extremity each bar does not exceed $\frac{1}{4}$ of an inch in breadth; but it gradually expands untill it has acquired the breadth of about one inch at the opposite end, where it is deeply notched. The four little bars being placed side by side are bound firmly together by means of strong cotton thread, and the points at their cutting extremities are kept separated from each other to the extent of $\frac{1}{16}$ of an inch by means of the cotton thread which is passed between each pair of contiguous blades. Thus prepared the instrument presents four pair of carved pointed diverging blades somewhat similar in shape to the lancet blades of a cupping scarificator.

"In employing the mushtar only one set of points is brought into use at a time, and the capsule is scarified longitudinally from its base to its summit, the incisions generally passing more or less along one of the longitudinal eminences ob-

servable on the outside of the capsule, which mark the attachment of the internal dissepiments. The scarifications thus made are very superficial and do no more than haverse the thin pericarp of the capsule. If a horizontal section be made of the capsule of a vegetating poppy plant the milky juice will in a few seconds be perceived to exude first and in greatest quantity from those portions of the sarco-carp which corresponds to the basis of the dissepiments.

"It does not, however, exude only from these points, but ultimately from the entire surface of the cut sarco-carp. It moreover does not appear in clots as if poured out from longitudinal vessels, but exudes gradually from the meshes of the cellular tube. If a thin segment of the capsule be examined under a high magnifying power, no longitudinal vessels are observable, but a confused mass of celluloid tissue is observed occupying the interspace between epicarp and the endocarp and opposite to the duplicatures of the endocarp, which go to form the dissepiments, the meshes of the cellular tissue are perceived to be much larger than in other situations: hence the free exudation of juice at these points. It therefore appears that the mode of making the scarifications as actually practised is the most effectual that could be adopted. Each capsule is scarified from two to six times according to its dimensions; an interval of either two or three days being allowed after the operation."

Writers have varied these details according as they have viewed the matter at different stations, and the opium-eater should know that if the drug as it is gathered is wanting in adhesive or viscid properties, the elegant operator is in the habit of spitting upon the mass as he goes on kneading it up during its collection.

As before stated we have grown the white poppy in England in order to experiment upon its production of opium, but for our purpose, as time was no particular object, the incisions were made with a rough-edged penknife which was drawn either down or across the capsules so as not to penetrate to the interior, and after a day or so the inspissated juice was collected and kept in small jars. It had a dull, heavy, opium smell, and from some experiments upon its medicinal qualities it was reported to be little if at all inferior to the imported drug, which may well be, although our climate is not such as to aid in the best development of opium, seeing that it is next to impossible to get the imported article absolutely pure. Of course the great drawback to the growth of opium in England is the uncertainty of the climate; a wet season would be fatal to the drug if only from moistening and

washing it away, but still the poppy head may be useful for the purposes of making extracts, and it would, we think, be well to ascertain whether morphia could not be procured from this source.

Speaking of the capsule reminds us that the white poppy is especially prolific in seed bearing, and in as far as we have seen these seeds are not attacked by insects as are those of the red poppy. They yield a quantity of oil which is highly extolled by artists for its purity and the freedom with which it works; but useful as the plant undoubtedly is it hardly pays for the expenses and trouble, and therefore with us we may only look upon the matter as one of interesting trial and experiment. It should also be stated that there is not now the market for poppy heads or capsules as there used to be. At one time a fomentation without these and the addition of chamomile flowers would be hardly considered worth the trouble of using, but now we are got to think that as the utility of this medicament depends upon warmth and moisture, the tea kettle at once supplies this remedy without having recourse to the various vegetable broths that at one time (aye and even now) were so much thought of by old women.

As an evidence of the mistaken ideas which prevailed on this head, it may be stated that said elderly ladies would reject poppy heads unless they were full of seeds, and hence to secure the capsule entire it was almost necessary to grow them at home, and so the smaller or larger plots of these which might formerly have been seen around most of our large towns were doubtless grown with a view to supply the wants of the neighbouring druggists.

The importance of opium in a commercial, moral, political, and medical point of view can hardly be over estimated. As regards the commerce in this drug, some notion may be obtained from the following table, which exhibits the number of chests sent from Patna, Benares, and Malwa to China, in which latter country more than one war has originated in dispute about opium, in reference to which we are told that in 1839 no less than 20,283 chests of opium, valued at nearly £3,000,000 sterling, were delivered up to the Chinese, and by them destroyed by immersing the opium in water with lime and salt, and, when the whole had become a fetid mud, allowing it to escape into the river.

Estimate of quantity and total value of Indian Opium consumed in China during the years ending in 1832-3

Years.	Patna.	Benares.	Malwa.	Total.	
	Chests.	Chests.	Chests.	Chests of one pecul, or about 133½ lb. avoir.	Amount in Spanish dollars.
1827-28	4006	1128	4401	9535	10,427,075
1828-29	4831	1130	7171	13,132	12,553,215
1829-30	5564	1579	6857	14,030	12,057,157
1830-31	5085	1575	12,100	18,760	12,904,263
1831-32	4442	1518	8265	14,225	11,501,584
1832-33	6410	1880	23,693½	23,693½	15,352,426

As an evidence of the present importance of opium growth, we extract the following notes from the *Times'* Correspondent dated Calcutta, Nov. 21st, 1873:—

"I showed last mail what the famine is likely to cost the country—viz., from five to seven millions sterling according to the fate of the poppy crop of Behar and Benares. Except in the small portion of Shahabad now being irrigated from the unfinished Soane Canal, the accounts from the opium districts are very bad. Ghazeepore, in the Benares Divisions, is not so badly off as Behar, yet there only a fourth of the crop has germinated in the best villages, and elsewhere the seed has not come up at all. The opium year begins in September, when, and in October, advances are made to the cultivators. Rain and well-irrigation foster the poppy till the end of the year, when it begins to flower. By January I have seen half Shahabad one sheet of white poppy. Rain then or later destroys the flowers, causes the pods to rot, and the result is a poor out-turn. The absence of rain before January not only ruins the seed or plant, but empties the wells, as is now the case. Opium districts like Ghazeepore draw their rice suppply from Bengal, which itself needs large imports this year. The very strict rules of the Opium Department have been so far relaxed as to allow the unfortunate cultivators to sow food grains in land in which the poppy has failed. But that is a miserable concession, for will food grow there any more than the poppy? The Governor-General should see that the Department takes no water and no land —in Shahabad, for instance—which might produce food, whatever be the risk to the revenue. This little fact throws light on the official denials before the East Indian Finance Committee that the growth of the poppy does not interfere

with food. In the recent Ragpootana famine how many were turned back from Malwa to die in the deserts of Ragpootana because Malwa itself had to import food for its poppy cultivators."

The moral effects of opium must appeal to us as a most important matter when we consider that among great masses of the human race, opium eating is to them what drinking of alcoholic drinks is to others, and though we know that the habit of taking either to excess is fraught with the most serious consequences. Dr. Eatwell tells us that:—

"It requires no laborious research in civilised England to discover evidences of the pernicious effects of the abuse of alcoholic liquors; our open and thronged gin palaces and our streets afford abundant testimony on the subject; but in China this open evidence of the evil effects of opium is at least wanting. As regards the effects of the habitual use of the drug on the *mass* of the people, I must affirm that no injurious results are visible. The people, generally, are a muscular and well-formed race, the labouring portion being capable of great and prolonged exertion under a fierce sun, in an unhealthy climate. Their disposition is cheerful and peaceable, and quarrels and brawls are rarely heard even amongst the lower order; whilst in general intelligence they rank deservedly high amongst orientals. Proofs are still wanting to show that the moderate use of opium produces more pernicious effects upon the constitution than does the moderate use of spirituous liquors; whilst, at the same time, the consequences of the abuses of the former are less appalling in their effects upon the victim, and less disastrous to society at large, than are the consequences of the abuse of the latter. Compare the furious madman, the subject of delirium tremens, with the prostrate debauchee, the victim of opium; the violent drunkard with the dreaming sensualist intoxicated with opium; the latter is at least harmless to all except to his wretched self, whilst the former is but too frequently a dangerous nuisance, and an openly bad example to the community at large."

From these remarks we may gather that for ages mankind has been used to a kind of anæsthetic treatment to assuage the woes of both body and mind; one half the world thus drifting into intoxication on the one hand, and insensibility and soporism on the other, and both may be useful if moderated with a strong will, but whenever indulgence, be it of what kind it may, becomes master, the result is sure to be mischievous.

In the matter of a drug so important as opium, it will

follow that many and most careful chemical analyses have from time to time been made, and it has been made out from these that opium is composed of many highly complex substances. Amongst these we may mention the following:—

1. Volatile odorous principles.—(Volatile Oil)
2. Morphia.—The most valuable and the more active principle.
3. Codeia—From κώδεια, a poppy head.
4. Narcotina.—The more narcotic principle of opium.
5. Narceine.—A supposed stupefying principle, so called from *νάρκη, stupor.*
6. Meconine.—Not an alkaloid.
7. Thebiana.
8. Pseudomorphia.
9. Porphyroxin.
10. Resin.
11. Extractive.
12. Fatty matter.
13. Meconic Acid, and probably other acids.

These may all be described as proximate principles, but besides them may be found the different earths, metals, and other inorganic matters.

Of course these vary in different samples, but in sampling specimens of opium the market value will mostly depend upon the amount of contained morphia.

As regards the medicinal action of opium on man and the lower animals, it may be enough to say that in both schools of medicine there are cases in which we have heard it described as the practitioner's sheet-anchor. In both schools the *Papaver somniferum* and its products are employed in many officinal preparations, several of which are recognised as both internal and external remedies.

It is, too, well known that opium is a most powerful poison, to obviate the effects of which, rousing the patient, *cold affusion, irritants, venesection, stimulants, vegetable acids, artificial respiraton,* and *electricity,* have been principally relied upon.

THE PATHOLOGY OF VERTIGO IN THE HORSE.

By A. J. Murray, M.R.C.V.S., Detroit, Michigan, U.S.

Vertigo, megrims, or staggers, as it is sometimes called, has hitherto been regarded by veterinarians as arising from congestion of the brain. In describing this disease, the late Professor Dick, of Edinburgh, says:—"The horse staggers, swings from side to side, lies on the pole, stops and falls, or falls running." He also remarks—"The fit probably arises from accumulation of blood in the head."

The late Mr. Percivall, in his 'Hippopathology,' confesses that he cannot give any opinion as to the nature of vertigo, and further remarks that the pathology of the disease remains undeveloped.

The authors of the 'Dictionnairé Générale de Médécine et de Chirurgie Vétérinaire' remark that vertigo "est toujours une signe de congestion ver le cerveau."

Professor Gamgee, in his work on the diseases of domestic animals, agrees with the preceding writers in attributing vertigo to congestion, but he advances beyond them in pointing out the causes of the congestion. To use his own words:—"I restrict," he says, "the term megrims to a vertiginous affection only seen in animals at work, and when driven with a collar. The vertigo never shows itself in the stable, or when the animal is ridden." He also remarks, that horses which are not worked with collars never suffer from vertigo. He also says—"Some horses have such peculiarly-shaped necks as to require a special kind of collar to prevent attacks of megrims, which are invariably due to *pressure on the jugular veins*."

In speaking of the symptoms, he gives prominence to "the turgid condition of the veins of the head," and also states that, on examination, the collar will be found pressing on the jugular veins, which will account for the above-named "turgid condition." Professor Gamgee concludes by remarking "that the disease is entirely due to the malformation of the neck and the manner in which the collar rests on it." No description of the malformed neck is given. But he further remarks:—"The cases of staggers seen in saddle horses, or which occur at intervals in the stable, are due invariably to organic lesions, and should not be confounded with that very common and preventible series of

symptons observed in carriage horses, from being unable to wear tight and badly-fitting collars."

Mr. Finlay Dun holds a similar opinion, for in speaking of the prevention of vertigo he says:—"Horses subject to it should be driven with a breastplate or pipe collar, *so as to prevent pressure on the vein carrying the blood from the head.*"

In a still more recent work by Messrs. McEachran and Smith, which has been published in Canada, it is stated that "vertigo is most commonly seen in harness horses, usually during hot weather; occurs generally on a heavy pull going up hill, probably from pressure of the collar interrupting the return of blood from the head; or the long-continued restraint the bearing-rein puts the head to, may prove the exciting causes in animals predisposed to it."

It would be needless to quote the opinions of other veterinary surgeons, as the essential points on which those authors agree represent pretty generally the opinion of the profession.

In the United States, as in other countries, a collar which fits on the lower part of the neck is used for horses of heavy draught, and it is this kind of collar which is supposed by pressing on the jugular veins "to interrupt the return of blood from the head." In buggy horses, however, the same kind of collar is used which both Mr. Finlay Dun and Mr. Gamgee state will prevent pressure on the veins carrying the blood from the head, and will consequently prevent attacks of vertigo.

Unfortunately for the theory that vertigo is owing to pressure of the collar, I have observed not a few cases in which horses suffered from vertigo which were driven with a breast collar. I have also examined the course of the jugular vein, which is lodged in a sort of groove between the mastoido-humeralis and sterno-maxillaris muscles, and from my examination it seemed that the pressure of the collar must be rather on the above-mentioned muscles than on the veins.

On the 2nd September last, however, I had an opportunity of testing the truth of this theory on a bay horse seven years old, which was affected with glanders, and for that reason had to be destroyed. The disease had made little inroad into the horse's stamina, and the various functions of the body were naturally performed, so that there was nothing to invalidate the result of the experiment. I ligatured both jugular veins in this horse, and observed that immediately afterwards the superficial veins above the ligatures began to swell. About ten minutes after applying the ligature I observed that for a minute the pupils were dilated, but this passed off rapidly, and they regained their natural appear-

ance. I had the horse under observation for twenty minutes after applying the ligatures, and though he was walked about during that time he did not show any symptoms of vertigo, nor, indeed, did he seem in any way distressed. I need hardly say that the theory of pressure on the jugular veins causing vertigo becomes quite untenable after this experiment.

On the 4th September I ligatured both carotid arteries of a sorrel horse aged five years, which was affected with glanders, but was otherwise in good condition. I had him under observation for twenty minutes, and though he was walked about during that time he did not show any unsteadiness in moving, nor, indeed, disturbance of any kind.

It appears that the functions of the brain are not immediately affected by interrupting the flow of blood in the jugular veins and carotid arteries, and that the cerebral functions are comparatively unimpaired while the vertebral vein and artery are patent. I have for some time held the opinion that vertigo does not arise from congestion. It has appeared to me that the sudden giddiness, the staggering often succeeded by the horse's falling on the ground, are symptoms of syncope. Owing to weak nervous action of the heart the blood is not propelled to the brain, which induces a temporary suspension of its functions, or in some instances it is propelled so feebly as to disorder the functions of the brain, but not to suspend them. I think this is proved by the fact that a horse which falls to the ground during an attack of vertigo rapidly recovers, and is usually able to rise again in two or three minutes.

On one occasion I was consulted by a physician as to a bay horse five years old, which was subject to attacks of vertigo. When attacked the horse would raise his head and stagger to one side, though he never fell to the ground during any of these fits. He has also had similar attacks while standing in the stable. After treating this horse with purgatives succeeded by tonics, the fits did not occur so frequently, though his liability to them was not removed. I had him several times under treatment during the two years he was owned by the physician, and the only peculiarity about the horse which I could discover was that the action of the heart was very easily accelerated. On approaching the horse the action of his heart became very frequent and irregular, and afterwards its action very gradually became natural in proportion, apparently, as he became accustomed to my presence. I may mention that I always approached him very quietly, and without any abrupt movement.

In another case I had a bay carriage horse, about six years old, under treatment, and I observed the same peculiarity in the action of his heart. The case occurred during hot weather, but recovered in a short time after the administration of bromide of potassium.

I was consulted in reference to another case, which, however, I had not an opportunity of examining; but the case is rather interesting from the horse showing a higher degree of excitability than the two already mentioned. When this horse was brought out of the stable to be hitched to the carriage he became excited and staggered, but did not fall. When this temporary giddiness passed off he appeared quite well.

In a fourth case the horse was subject to fits in the stable, but did not suffer from them while being driven. He would fall down suddenly in the stable, remain still for a few minutes, and then rise again. This horse appears to have had syncope, but it did not interfere with his fitness for working.

I incline to the opinion that several different conditions are confounded by veterinary writers under the term vertigo, or megrims. I hold that cases such as the four already described arise from weak and irregular action of the heart, which produces disorder, or, as in the last, a temporary suspension of the cerebral functions.

Those cases which are described as occurring in harness horses, during hot weather, when they are pulling a heavy load up hill, are cases of dyspnœa arising from the pressure of the collar on the windpipe. The trachea is the part which must suffer from the pressure of the collar. When the collar is pushed forward, as has been directed, "to relieve the jugular veins," the trachea is relieved from pressure, and the symptoms of dyspnœa gradually disappear.

I believe the late Professor Barlow, of Edinburgh, attributed vertigo to the presence of tumours in the choroid plexus, but I am not aware that he traced any definite relation between these tumours and the symptoms of megrims.

The liability to vertigo does not appear to arise from organic disease of the brain, but rather from what might be termed irritability of the brain. Exposure to the sun's rays probably produces an irritable condition of the brain, which disorders and enfeebles the action of the heart so as to cause giddiness, which, however, is only transient, and will not reappear except under the influence of an exciting cause. This appears a sufficient explanation of the more frequent occurrence of vertigo in hot weather. Bleeding is often resorted

to in such cases on the principle that it relieves the congestion of the cerebral vessels, which must tend to render such attacks more frequent. Sprinkling cold water on the head, by stimulating the nervous centres, will restore the natural action of the heart. When horses are subject to vertigo in hot weather, several folds of white linen fastened on the upper part of the head would serve as a protection.

The cases of dyspnœa which arise from pressure of the collar on the trachea have been incorrectly regarded as cases of vertigo. Such cases are also more apt to occur in hot weather, though the reason is obvious enough that severe exertion is more exhausting in hot weather than in cold. Rest and the application of cold water to the head will soon relieve the dyspnœa.

EXPERIMENTS ON THE ACTION OF DIFFERENT CHEMICAL AGENTS ON THE HÆMATOPINUS VITULI (LOUSE OF CALF).

By the Same.

Having made some further observations on the action of some other chemical agents which are commonly used as parasiticides, I will shortly describe the results. The agents used were alcohol; a solution of quassia, prepared by boiling 1 oz. of quassia chips and 1 drachm of Sodæ Carb. in half a pint of water; Tinct. Verat. Alb. of the U. S. Pharmacopœia; Tinct. Cocculi Indici of the U. S. P.; Tinct. Delphini Staphisagriæ of the U. S. P.

In experimenting with tinctures, it is obvious that it is necessary, in the first instance, to ascertain the action of alcohol.

The immersion of the pediculi in alcohol did not destroy life, and in examining them frequently during an hour and a half they showed signs of life; the solution of quassia appeared to have no injurious effect, though at the end of an hour and a half it appeared to have destroyed one parasite; at the end of an hour and a half one parasite was destroyed by the cocculus indicus; the same remark applies to those upon which the Tinct. Verat. Alb. and Tinct. Staphisagriæ were applied. I may mention that two or three parasites were experimented on with each agent, so that one may fairly estimate their efficacy by stating that they destroy one half of the parasites which are thoroughly subjected to their action. Unless the

pediculi are observed during a sufficient length of time, one may give some preparations credit for more efficacy than they deserve. During the hour and a half I thought, at one time, that Staphisagria and Veratrum album had killed all the pediculi upon which they had been applied, but towards the end of that time they recovered their power of movement, and showed unmistakeable signs of life. The conclusion from the foregoing observations is, that the different preparations experimented with have not much efficacy as parasiticides. It remains to be seen, however, what effect they would have on the pediculi of the other domestic animals and on those of the human subject. It is probable that their action would be somewhat similar.

COMMINUTED FRACTURE OF THE PELVIS, WITH EXTENSIVE COMPLICATIONS IN A MARE.

By John Howard, M.R.C.V.S., Marknich, Fife.

On the 16th of October last I examined an aged grey mare at the stables of Mr. Ireland Leslie. I was informed that she had been lame for three months, and had been treated by a quack, at the commencement of her illness, for weed (lymphangytis) in the near hind leg. She had been bled at the toe, physicked, and fomented; but no improvement took place. The animal had been driven a long distance in a loaded cart on the day she first became unwell, and was brought home dead lame of her hind quarters. The driver being interrogated upon the subject, said he could give no reason to account for her condition, but the reader will, no doubt, soon see how matters really stood. I found the mare very lame of both hind legs, particularly the off one, and stiff about the loins. She moved with a straddling gait. From outward appearance I suspected an injury to the bones of the pelvis.

On examination per rectum I discovered a fracture in the region of the symphysis pubis, extending to the shaft of the right ileum, involving the obturator foramen and acetabulum. From the length of time the injury had been inflicted, an immense quantity of reparative material had been deposited, so that the part felt like a hard tumour under the hand. The mare was thick-winded, affected with chronic cough, and had a large melanotic deposit under the tail, immediately above

the anus. She showed no symptoms of pain, except when compelled to move, was free from constitutional disturbance, and took her food well. I pronounced the case incurable, and recommended the owner to have the animal destroyed. I saw no more of the mare for eighteen days, when I was again requested to examine her. I was told that three days previously she had fallen in her stall on the right side, and since that time had been unable to rise; slinging had been attempted, but was found impracticable. The poor animal presented a very melancholy spectacle, the effects of the last fall had set up violent inflammation in the already seriously injured parts; the postero-superior spine and crest of the ileum being brought in such violent contact with the sacral vertebræ as to cause injury to the spinal cord, that complete paralysis of the hind extremities had resulted. Other distressing and remarkable symptoms were present, the labii pudenda and mammary glands were greatly enlarged and inflamed. To outward appearance the mare might have been supposed by an inexperienced person to be on the eve of parturition.

On examination per vagina, which was relaxed sufficiently to admit of the easy passage of the hand, I found the uterus hot, painful, and much above the normal size. A discharge of bloody mucus and serum followed the withdrawal of the hand. The bladder was distended with urine, which was evacuated by inserting a finger into the meatus. The organ seemed to be participating in the general disturbance.

The mare's pulse was over 100 per minute, and so weak as to be barely perceptible, and the respiration much accelerated. The animal was groaning and grating the teeth continually; the body was bedewed with cold perspiration, the eyes were of a leaden hue, and retracted in their orbits.

In charity to the sufferings of the mare, I urged upon the owner to have her destroyed, which was accordingly done.

Autopsy.—Inflammation of the mammæ, vulva, vagina, and uterus, extending along the Fallopian tubes and ovaries.

The neck of the bladder enlarged and inflamed, also the anus and posterior portion of the rectum.

In dissecting away the tissues to reach the seat of fracture I found further complications, showing that extensive myositis had taken place in the muscles adjacent to the fracture, many of which were dark coloured, soft, and friable, with clots of black coagula interspersed throughout their substance, and infiltrated between their sarcolemmæ. The whole of the muscles of the right thigh were in this condition, which

extended downwards to within about two inches of the fibro-femoral articulation.

The fracture proved to be of a comminuted character, the ilium had been broken through its shaft, and the body of the bone was displaced upwards and forwards; the transverse process of the last lumbar vertebræ had been injured from concussion with its crest. The pubic bones appeared to have been split horizontally through their centre, the inferior half being forced downwards and the superior portion upwards; the space between their cancelli was filled with the products of inflammation. The compact tissue of the bone was shattered into many pieces, displacement being prevented only by the periosteum. The obturator foramen was so completely involved in the fracture as to be almost indistinguishable, a mere oblong slit being left which barely admitted the passage of the scalpel; it extended into the cotyloid cavity, the articular cartilage of which and the head of the femur being extensively involved in the inflammatory process. Some portions of the new deposit round the seat of fracture were decidedly of a melanotic character, comparing exactly with the appearance of the external tumour before mentioned under the cortex.

This case of fracture I have recorded on account of the many extraordinary complications to which it gave rise, and the pathological interest it consequently possesses.

HUSK IN CALVES.

By Henry Jarvis, M.R.C.V.S.L., F.V.M.A.

During the months of October and November of this year I was requested to attend several herds of calves suffering from an attack of filaria bronchialis.

The different herds numbered from twenty to forty in each herd, on different farms and in different localities. I may here state that I have never known a year so remarkable for the spread of this malady, neither can I ascertain from older practitioners a year in which so much of this disease has been known to exist.

My mode of treatment has been to give, in the first place, a saline aperient to each calf, consisting of

Mag. Sulph., ℥iv.
Pulv. Zingiber., ℥ss.
,, Anisi, ℥ss.
In aqua, ℥viij.

On the day after the purgative, the calves are confined in a close building, and made to inhale chlorine gas, prepared by pouring dilute sulphuric acid on chloride of lime. Great caution is necessary in the administration of this gas. On the eve of the same days (as the chlorine gas is administered) a mixture is given to each calf, composed of

Ol. Tereb.,
Ol. Lini, aa ʒj.
Liq. Ammon., ʒss.
In aqua ʒviij.

The calves during this treatment are kept very well, *i. e.* they have crushed corn and linseed cake night and morning; and to such calves as do not feed, gruel is administered frequently during the day with boiled linseed.

Although this disease is acknowledged to be one of a very dangerous and troublesome character, this treatment, which was carried out with the aid of my esteemed friend and partner, Mr. Charles Taylor, was very effectual; not one of my patients having died from the effects of the disease.

Many theories have been advanced as to the means by which these filariæ find their way into the bronchial tubes. I should for one be pleased if some professional friend would offer a few remarks that would make the matter a little more clear than it is at present.

I fear, however, that an inquiry into the production of these parasites will prove as lengthened as it is likely to be an inconlusive investigation. Respecting it, two opinions seem to divide naturalists: first, that there is an universal diffusion of germs for the development of life for which a fit state of the tissues or system is necessary. Secondly, what is called fortuitous or spontaneous generation exists, a view which, in reality, tells us nothing, while, at the same time, it is a barrier to further inquiry and research. I confess that I cannot subscribe to the doctrine, that while organic bodies by the action of the chemical forces are undergoing decomposition, the like forces effect the reunion of their elements, and bring about the formation of the simplest kinds of animal organism, and that these by aggregation constitute the more complex structures, else what necessity is there for the sexes? and why is it we see no marked deviation from the beautiful system which obtains throughout animated nature? Not only is the type preserved among animals, and that of the lowest order, but the peculiarities of each species are also preserved. Nothing is taken away, nothing added thereto. It is as easy to conceive the

chance formation of a man as of a monad, of the gigantic oak, as of the lowest conferva.

SUBCUTANEOUS APPLICATION OF MORPHIA SUPPOSITORIES IN VETERINARY PRACTICE.

By S. Newman, M.R.C.V.S., Havant, Hants.

In accordance with the suggestion of Dr. Crombie, as published in the *Veterinarian* for October, I have given trial to his morphia suppositories, but have not as yet been successful in producing anæsthetic effects on my patients, as I did not find the needle suppositories as recommended by Dr. Crombie, and supplied by Messrs. Mackay, of any practical value. My method of procedure was as follows: I made an incision with a lancet in the course of the vessels inside both thighs of three different horses on which operations were required, and introduced into each one of the suppositories. The animals were carefully watched for three hours; but I failed to perceive during this time any narcotic or even sedative effects on the system. Under these circumstances, it may be questioned as to how far morphia is likely to supersede the use of chloroform in veterinary practice.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"Return of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of November, 1873, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Hamburg	Hull . .	Sheep-Scab	...	2	...	...	2	2
Total . . .		...	...	2	...	...	2	2

"Privy Council Office, "ALEXANDER WILLIAMS,
"Veterinary Department, 11th December, 1873." Secretary.

CATTLE PLAGUE.

Cattle plague is reported to exist in Upper Austria, in Dalmatia, Croatia, Sclavonia, also in several places near Tripoli.

Hungary was reported free on December 8th, and in Warsaw and Lublin the disease is said to have materially decreased.

An outbreak of cattle plague is reported to have occurred in Bavaria, near Wegschen, on the Austrian frontier, in the latter part of November. No details have been received.

No cases of cattle plague have occurred in the district of Beuthen since the middle of October.

Cattle plague is reported to have broken out at Madeira. The cattle bought on the island for Cape Coast Castle and already shipped are also said to be affected.

No official information on this subject had been received up to the time of going to press.

PLEURO-PNEUMONIA.

According to the last returns there were forty-seven counties infected with this disease, as against forty-four in the corresponding week of the previous year. It does not appear, therefore, that the Order for compulsory slaughter of diseased cattle has yet had any effect in arresting the progress of the disease; in fact, we do not apprehend that any appreciable effect will be produced until the matter is taken up in

earnest, and summary methods adopted for the detection and eradication of the malady.

At present the owners of stock have but little inducement to give information of the existence of pleuro-pneumonia among their animals, besides which, when the affection is discovered, there is considerable delay in carrying out the law.

Pleuro-pneumonia is reported to be extending to an alarming degree in some parts of Switzerland. It has broken out afresh in several cantons, more particularly Berne, Neuchâtel, and the Grisons. In the canton of Friburg, where it had disappeared, it has again attacked several districts at once; and in consequence of its virulence in the Vaud, a large number of cattle have had to be destroyed. In the latter canton all cattle fairs and markets have been suppressed until further orders.

SHEEP-POX AND SHEEP-SCAB.

Both these diseases are said to be very prevalent in many parts of Pomerania.

THE AMERICAN HORSE DISEASE.

This distemper among horses, to which we have frequently referred, is reported to have reappeared in New York. The attacks hitherto have been distinguished by a remarkably mild character.

Facts and Observations.

German *v.* French Military Horses.—A German correspondent writes:—All the Prussian cavalry regiments have had to report to the Emperor William their experience of the French horses which they captured and utilised during the war. Though differing on many points, the reports agree in general that the German military horses are preferable in nearly every respect to the French, and especially to those of Arab race. This confirms what was stated to me in September, 1870, at the camp of Beverloo, in Belgium, when I went to see the French prisoners there, who had a number of their horses with them. The Belgian officers, as well as the French cavalry sergeants (there were no French officers in

the camp), declared to me that the Arab horses, of which there were some fine specimens in the camp, could be considered in a military point of view only as pretty toys.

THE PARIS OMNIBUS COMPANY AND ITS KNOCKED-UP HORSES.—The Omnibus Company of Paris intends for the future to send its unsaleable horses to the abattoir, and to retail the flesh of costly *Percherons* to those of their servants who desire it. Meat is so high in price, that the employés in question cannot afford to purchase it. The Company has 9000 horses in its service, and on an average 120 are more or less knocked up, and six per week have to be disposed of.

PREVENTION OF TORMENTING OF HORSES, &c., BY FLIES.—M. Rochard, a veterinary surgeon, describes a simple and economical means of preventing the suffering which is induced in horses and other animals by the persecution of flies, and which our provincial readers will probably be induced to try. It consists in painting with a pencil the insides of the ears, or other parts liable to be bitten, with a few drops of empyreumatic juniper oil (*huile de cade*). Insects will not approach the parts so painted, and the cost of the oil is trifling. —*Journal de Connaissances Méd.*

COMPOSITION OF THE GREY AND WHITE SUBSTANCES OF THE BRAIN. By D. PETROWSKY.—These researches, which were undertaken in Professor Hoppe-Seyler's physiological laboratory, consisted of two analyses, for each of which four bullocks' brains, as fresh as possible, were used. The grey layer was separated from the white by means of water and a portion of the white matter was taken from the interior. Each substance was rubbed up rapidly in a mortar, and three extracts and a residue were obtained by digesting it respectively in cold alcohol, ether, and hot alcohol. Omitting numbers, the components of these extracts and residue are seen from the following table:

1. *Cold alcoholic extract* contains—
   a. Substances insoluble in anhydrous ether,
   b. „ soluble „ „
2. *Etherial extract* contains—
   Lecithin,
   Cholesterin and fats.
3. *Warm alcoholic extract* contains—
   Lecithin,
   Cerebrin.
4. *Residue* contains—
   Albuminous substances,
   Salts.

The method employed in estimating the lecithin from the magnesium pyrophosphate was that recommended by Hoppe-Seyler.

No sugar could be detected in the portion of Extract 1, insoluble in anhydrous ether (*a*).

The author gives a table showing the average composition from the two analyses of the grey and white substances respectively, from which it appears that the dried *grey substance* consists about half of albumin, a quarter of cholesterin and fats, and very little cerebrin, its principal components, therefore, being albumin and water. In the *white matter*, on the contrary, cholesterin and fats for much more than half the dried mass, albumin a quarter of the whole substance, and cerebrine is present in considerable quantity.—*Journal of the Chemical Society.*

Brittleness of the Bones in Horned Cattle. By J. Nessler (*Annalen der Landwirthschaft*, 1873, 126—127).—In some places horned cattle, when fed on certain kinds of fodder, suffer from an unusual brittleness of the bones. Nessler finds—

1. That in the hay which produces such brittleness the protein bodies are usually deficient. 2. All the suspected hay was poor in sodium compound. 3. In a peculiar sort of hay, very apt to produce the brittleness in question, the amounts of phosphoric acid and of calcium were very small. 4. The waters drunk by the affected cattle contained but a small quantity of mineral matter. 5. In the Black Forest the disease existed only upon granite soils, variegated sandstone, and the junction of the granite and gneiss.—*Ibid.*

The Presence of Bile-acids in Normal Urine. By Vogel and Dragendorff (*Zeitschr. Anal. Chem.*, xi, 467—469).—By an extended series of experiments Vogel and Dragendorff demonstrate the presence of bile-acids as constituents, not only of pathological, but also of normal urine. Dragendorff extracted ·7—·8 gram of the acids from 100 litres of healthy urine.—*Ibid.*

On the Normal Microzymas of Milk, as the Cause of the Spontaneous Coagulation, and of the Alcoholic, Acetic, and Lactic Fermentation of that Liquid. By A. Béchamp (*Compt. rend.*, lxxvi, 654).—To observe the microzymas of milk, it should be diluted with five or six times its volume of creosoted water and filtered. The filter will retain a certain quantity of insoluble matter, which should first be treated with ether to dissolve out the butter, then with a dilute solution of sodium carbonate to take out a

little casein, and lastly with distilled water. Under a power of 500 diameters the microzymas may then be clearly distinguished.

Milk drawn direct from a cow into apparatus specially arranged to exclude the air, and kept at a temperature of 35° C.—40° C., was found to be curdled on the third day. At the time that the coagulation becomes clearly perceptible no organism except microzymas can be detected in the milk. Lactic acid, acetic acid and alcohol, are also found in milk curdled under these circumstances, and the author therefore concludes that the fermentation which is set up and produces these substances is due to the microzymas normally present in the milk.—*Ibid.*

Consumption of Water by Animals. By M. Henneberg (*Dingl. polyt. J.*, ccvii, 431).—The author has observed that with an increased consumption of water by animals a larger quantity is given off by the skin and lungs, and at the same time less of the carbohydrates of the food is assimilated, and more nitrogenous matter voided in the urine. It is, therefore, not economical to administer much water to fatting animals, or to keep them in hot stalls.—*Ibid.*

The Purification of Hydrochloric Acid. By Engel (*Compt. rend.*, lxxvi, 1139).—In order to remove arsenic from hydrochloric acid the author recommends an addition of four or five grams of potassium hypophosphite to each litre of the acid; the arsenic soon becomes reduced, and when it is all deposited the clear acid can be decanted and distilled.

Potassium hypophosphite can be used as a test for the presence of arsenic in hydrochloric acid, the reduction taking place immediately on the application of heat.—*Ibid.*

Variations of Hæmoglobin in Disease. M. Quinquaud.—In a healthy person the proportion of hæmoglobin is about 125 to 130 grs. per 1000 grs. of blood. But it varies very much in disease; sometimes, as in cancer, falling as low as 38 grs. It may thus serve, M. Quinquaud thinks, in diagnosis and prognosis. He gives several instances, and adds a determination of the hæmoglobin for some twenty different kinds of disease. Cancer, chlorosis, and tubercular phthisis of the third degree, are those which diminish the proportion most.

THE VETERINARIAN, JANUARY 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

THE EFFECTS OF THE RECENT FOG ON THE SMITHFIELD SHOW AND THE LONDON DAIRIES.

IF any one, a few weeks ago, had suggested the possibility of a London fog doing serious damage to cattle, or other animals, submitted to its influence, he would have been looked upon as supplying in himself a melancholy instance of intellectual fogginess. All the inconvenience and discomfort of a Metropolitan fog, with its palpable flavour and pungency, dwellers near the city realise full well; but in all our experience there could be found no grounds for serious apprehension. Nevertheless, it is beyond question, that a number of animals did suffer seriously from the inhalation of the fog-clouded atmosphere which prevailed during the second week of December.

Fat cattle in the Agricultural Hall suffered most from breathing the unaccustomed air. Cattle in the open market at Islington, some from the country and some from abroad, were also affected by influences which were new to them; but what is still more remarkable is, that London cows inured to fogs yielded to this particular one, and became so much distressed that their owners were driven to seek veterinary aid, and in some instances even to send the animals attacked to the butcher. It is useless to speculate on the nature of that susceptibility which rendered certain cattle easy victims to influences which others resisted. It is true, of all causes of disease, that some men as well as the lower animals are attacked, while others, exposed to the same external conditions, entirely escape.

The facts to which we have referred in our report of the effects of the fog are sufficiently interesting to justify the course which we have adopted, of stating them as distinctly as possible, and as nearly as we could, in the order of their

occurrence, without attempting to explain all the contradictory points which presented themselves in the course of the inquiry.

Extracts from British and Foreign Journals.

THE EFFECT OF FRESH CHOLERAIC EXCRETIONS ON ANIMALS.

Dr. Andreas Högyes, of the University of Pesth, has availed himself of the opportunity afforded by the recent epidemic of cholera in that city, to make a series of investigations on the effects produced on animals, by the discharges from persons suffering from the disease. He gives a brief summary of his experiments, and of the results at which he has arrived, in the *Centralblatt für die Medicinischen Wissenschaften* for November 1 and 8, reserving a more complete account for another occasion.

The following are questions of which Dr. Högyes endeavoured to find the solution.

1. Are fresh choleraic discharges capable of exciting a deleterious influence on the organism, and in what form?

2. Does gastric and intestinal catarrh, artificially produced, increase the liability to be affected by choleraic discharges?

3. Is the air capable of carrying with it particles of choleraic evacuations, which act injuriously on the organism; and, if this be the case, is there a difference between non-disinfected and disinfected discharges, simple diarrhœal dejections and putrid fluids?

4. Are choleraic evacuations, when freed from elementary organisms, capable of affecting animals?

5. What parts of disinfected and non-disinfected choleraic discharges does a current of air carry with it? What is the further fate of these elementary forms, if they fall on a soil favourable to their development, or on one that is neutral? In what way do they modify the action of this medium?

In his experiments, Dr. Högyes used choleraic evacuations that had been discharged an hour, or an hour and an half. The animals operated on were dogs and rabbits.

Six dogs of middle size were the subjects of experiments

bearing on the first and second questions. In three, catarrh of the stomach and intestines was induced by the administration of the sulphate of copper and the subcutaneous injection of a few drops of croton-oil; the other three were allowed to remain healthy. As soon as the vomiting and diarrhœa had ceased in the first three dogs, Dr. Högyes administered to each of two dogs (one healthy and one diseased) fresh urine, intestinal evacuations, and vomited matters, from cholera patients. Both dogs had intestinal catarrh (frequent vomiting and diarrhœa). The dog with the sound intestinal canal was well on the third or fourth day; while one of those in which gastro-intestinal catarrh had been induced died on the second day, having had constant vomiting and fluid evacuations; and the other two were not convalescent until the fifth or sixth day, and remained weak some time afterwards.

To obtain an answer to the third question, Dr. Högyes kept rabbits exposed for some time to currents of air charged, 1, with non-disinfected; 2, with disinfected choleraic evacuations; 3, with ordinary diarrhœa stools; 4, with the fluid of putrid meat. The oxygen necessary for respiration was supplied in abundance. The rabbit in each case was confined in a glass bell-jar, placed in a well-ventilated apartment; the bottom of the jar was air-tight, and the air, charged with the evacuations or with the putrid fluid, passed in by one aperture at the top and escaped by another. The air, having been first made to pass through the fluid of which the effect was to be tested, was forced into the jar by a Bunsen's water apparatus at the rate of 15 *litres* per minute. To prevent the air from escaping in its foul state throngh the ventilating tube, it was made to pass through cotton-wool and sulphuric acid; and in this way it was possible, without danger of injuring the health of the operator, to continue the experiment for any time.

Two rabbits, in one of which bronchial catarrh had been induced by the inhalation of ammonia, were subjected for twenty-four hours to a stream of air charged with non-disinfected choleraic evacuation. While under the bell, the animals had slight catarrh, did not eat, and were depressed. In the third twenty-four hours, violent diarrhœa set in, and both animals soon became cold and collapsed; the one in which bronchial catarrh had been induced died first; and the other five hours afterwards—both presenting the same symptoms. A small rabbit, exposed for twenty-four hours in the same apparatus to air charged with choleraic discharges disinfected by carbolic acid, remained healthy. Another animal of similar

size was kept without injury for twenty-four hours in a current of air saturated with ordinary diarrhœal evacuation. A larger rabbit, exposed for twenty-four hours to a stream of air saturated with the fluid of meat that had been decomposing during five weeks, at first lay stupefied at the bottom of the apparatus, but immediately afterwards rose up, and escaped without injury.

The experiments bearing on the fourth question consisted in the injection into the jugular veins of dogs and guinea-pigs, in one case of choleraic discharges microscopic organisms, and in other cases of the same discharges after filtration.

With regard to the last question, Dr. Högyes conducted through fresh non-disinfected choleraic discharges a slow stream of previously purified air. The elementary forms brought over with the air-current were received into two media—one neutral, distilled water; and one suitable for their development, Cohn's fluid. The fluids were drawn off by drops from the vessels, and examined with the microscope. Both distilled water and Cohn's fluid have no action when injected into the vessels; and the question was, whether their action would be changed by a certain amount of saturation. In a short time, a large number of elementary organisms (chiefly bacteria), with which the cholera excreta were saturated, were carried over into the fluid; and in twelve hours produced a milky cloudiness in Cohn's solution. At the end of twenty-four hours, the current of air was stopped. At the end of the second twenty-four hours, the surface of Cohn's fluid was covered with a bluish green shiny layer of cryptogamic matter, two centimeters thick; and the fluid itself assumed a peculiar smell, reminding one of decomposing fruit. The distilled water, which remained quite clear, although charged with organisms, and the Cohn's fluid, were injected into the veins of dogs and rabbits. The result was that both the distilled water and Cohn's fluid produced the same symptoms as the choleraic discharges when injected into the venous system—acute gastro-intestinal catarrh, and, in some of the rabbits, death.

Similar researches with discharges disinfected by carbolic acid showed that the power of development in the elementary organisms was destroyed; the Cohn's fluid still remained clear at the end of twenty four hours. On injecting the fluids into which the air has been conveyed through the disinfected excreta, the symptoms of poisoning with carbolic acid were produced; this is readily explained, when it is remembered that the current of air in the course of twenty-four hours

must have carried with it a large amount of carbolic acid.

While these experiments were being carried on, the attendant, who had been exposed for some time to the emanations from the vessels containing the choleraic excreta, had a severe attack of gastro-intestinal catarrh, which recurred twice within a short period. His little daughter, who slept with him, had vomiting and diarrhœa the day after he became ill. Five days after his illness two cases of cholera (one of which ended in death) occurred in the house in which he resided, which had hitherto been free from the disease. During the microscopic examination of the choleraic discharges, Dr. Högyes had loss of appetite, a coated tongue, and a constant sensation of oppression in the epigastrium; after the researches were complete, these uncomfortable feelings disappeared.

The following are the conclusions at which Dr. Högyes has arrived. 1. Fresh choleraic discharges exert an injurious influence on animal organisms, and, as it seems, in different degree in different animals. 2. The principal or infallible evidence of injury after the introduction of choleraic discharges in any way, is more or less of inflammation of the stomach and intestines. 3. An artificially induced gastro-intestinal catarrh renders animals more liable to be thus affected. 4. The same symptoms may be produced by the inspiration of a stream of air charged with particles from non-disinfected choleraic discharges, as well as by immediate action on the stomach, intestines, or venous system; while the particles in choleraic discharge disinfected by carbolic acid appear to be quite harmless. 5. A current of air, passing through non-disinfected choleraic excretions, carries with it cryptogamic elements, which vegetate abundantly in a favourable soil; while the same growths from discharges that have been disinfected by carbolic acid are incapable of multiplication. 6. Choleraic discharges freed from organised elements are capable, by reason of their chemical composition, of producing the same pathological changes as they do when they contain the organised forms.

[The above is taken from the *British Medical Journal*. If we recollect rightly, Dr. Lauder Lindsay, of Edinburgh, produced cholera in dogs, by experiment, more than twenty years ago. The dogs were wrapped in sheets used by cholera patients.—Ed.]

ON THE RIGHT USE OF DISINFECTANTS.*

By H. Letheby, M.D., M.A., &c., Professor of Chemistry in the College of the London Hospital, Medical Officer of Health and Public Analyst for the City of London; and President of the Society of Medical Officers of Health.

I am induced, gentlemen, to bring the subject under your consideration for the purpose of removing the many dangerous fallacies which beset it, and of arresting, if possible, the unblushing quackery which disgraces it. A glance, indeed, at the so-called sanitary literature of the day will show how boldly and how confidently the use of certain inert bodies is recommended to the public as powerful disinfectants. The danger of this, gentlemen, cannot be over-rated; for when by such means undue confidence is placed in the disinfecting power of an agent which fails in its purpose, the result is not merely a waste of materials and a loss of valuable time, but it is also a serious danger to the public. Therefore, it is that we shall be most careful in the selection of disinfectants—using those only which are known to be effective. It is necessary also that we should be thoroughly conversant with their several modes of action, and that in applying them we should be guided by rational principles suggested by the scientific aspects of the subject.

It is hardly necessary to say that the question in all its relations is very large and extensive; for by the term "disinfection" I mean the renewal, or neutralisation, or destruction of that which is offensive to the senses or hurtful to the body, limiting it of course to those cases where offensive effluvia, or noxious matters, or specific contagia are the subjects of treatment; and here I may remark that, although the questions before us are undoubtedly connected with the different problems now occupying the attention of physiologists, pathologists, and chemists as to the origin of infusorial life, and the cause of specific infectious maladies, as well as of organic decomposition, yet it is at the same time sufficiently independent of these abstruse inquiries as to be capable of very effective practical treatment at our hands, without much reference to the conflicting theories of genesis. To us, indeed, it is of little importance, except for the scientific elucidation and explanation of our empirical facts, whether the manifestations of life in a decomposing liquid be the

* Read at the meeting of the Society of Medical Officers of Health, on Saturday, October 18th, 1873.

cause of putrefaction and fermentation, or the *effects* of it; and whether it comes "*ex vivo*"—that is, from pre-existing life, as the Biogenists, the Homogenists, and the Panspermatists believe; or "*de novo*," as the Abiogenists, the Heterogenists, and the Non-Panspermatists maintain. Nor does it concern us in our practical treatment of the subject whether each distinct kind of spontaneous organic decomposition and each specific form of infectious disease are the results of the vital manifestations of special germs—differing in each case—or whether they are caused by the molecular movements of organic matter in peculiar states of decay; for that which we aim at, and which we undoubtedly are able to accomplish, is the destruction or prevention of the hurtful thing which causes offence or produces disease. And as in many cases this is associated with the changes incidental to organic decomposition, it may be effected in one of four ways—as, first, by strengthening the affinities of organic substances, and thus enabling them to resist decay; secondly, by so acting upon them with chemical agents as to produce new compounds which are not susceptible of organisation or decay; thirdly, by hurrying on the changes of decomposition and oxidation, so that the particles may quickly arrive at their final stages of decay, and be brought to rest; and, fourthly, by the use of special agents which are found to have specific powers of disinfection.

As examples of the first of these methods of preventing decay I may allude to the effects of cold and to the desiccation of organic matters.

As instances of the second I will refer experimentally to the coagulation of albuminous matters by alcohol, creosote, the mineral acids, and most mineral salts.

Under the third head are the oxidising influences of chlorine, hypochlorous acid, permanganate of potash, and atmospheric air, aided by water and porous substances.

And as examples of the fourth method of disinfection I may allude to sulphurous acid, to carbolic and cresylic acids, and to the volatile oils.

The relative values of these several disinfecting substances have again and again been tested by experiments. As far back as the year 1858 I entered very fully into the question of their action on sewage; but very recently they have been examined by Dr. John Dougall, of Glasgow, and Dr. Crace Calvert, of Manchester, with the view of ascertaining their respective disinfecting powers, as tested by their action on protoplasmic and fungus life, and on vaccine lymph. I have tabulated the principal results of these experiments, and

submit them to you for examination. Let us, therefore, discuss them in the order in which they are there placed:—

1. The Mineral Acids. — These are *Sulphurous Acid, Nitric Acid, Hydrochloric* or *Muriatic Acid, Sulphuric Acid,* and *Chromic Acid.* This is the order in which Dr. Dougall found they prevented the development of infusoria in infusion of hay, in urine, and in a mixture of beef-juice and egg albumen —sulphuric acid being the least effective, and chromic acid the most; for in the first case as much as one part of sulphurous acid in 117 of water was required to prevent such life during six days, while in the last case as little as one part in 2200 of water was sufficient. A like conclusion was arrived at when a solution of one part of the substance in 500 of water was used with a little beef-juice or egg-albumen. Dr. Crace Calvert, however, found that sulphurous acid was more powerful in its action than nitric or sulphuric acid when used in the proportion of one part in a thousand of solution of albumen, for in the case of sulphurous acid it required eleven days to produce vibrio life and twenty-one days for fungus-life, there being no putrid or mouldy odour for more than forty days, whereas with the like proportion of nitric or sulphuric acid the existence of such life was observed on the ninth and tenth days. In all cases the addition of these acids in small proportions, as from 1 to 2 per cent., to putrid matters swarming with animalcules immediately arrested life. In like manner the vitality of vaccine lymph was completely destroyed by the vapours of these acids. It would seem, therefore, that they are all powerful disinfectants, and this accords with experience; for as far back as the year 1773 Guyton Morveau, one of the most distinguished chemists of France, recommended muriatic acid vapour as a means of disinfecting hospitals; and in 1797 Dr. Carmichael Smith obtained a Parliamentary grant of £5000 for the successful use of nitrous fumes in the disinfection of our prisons. But sulphurous acid enjoys a reputation of much more ancient date. Homer tells us that Ulysses, after destroying the suitors, fumigated the rooms in which the bodies lay, as well as the rest of the palace, with the fumes of "pest-averting sulphur." Ovid, too, in the "Fasti" speaks of the cleansing and purifying power of sulphur; and Pliny, in his "Natural History," says "that brimstone is employed ceremoniously in hallowing of houses, for many are of opinion that the perfume and burning thereof will keep out all enchantments—yea, and drive away any foul fiends and evil spirits that do haunt the place." The Chinese have always attached considerable importance to the action of burning sulphur as a disinfectant, and have from time immemorial used pastilles of

sulphur for internal fumigation, and squibs and crackers for external.

In the act of generating the gas by burning sulphur in atmospheric air, thirty-two parts of it by weight combine with the same weight of oxygen to produce sixty-four parts of sulphurous anhydride, which occupies precisely the same bulk or volume as that of the oxygen consumed. The density of the gas is considerable, for its specific gravity is 2·247, or very nearly twice and a quarter that of atmospheric air, a cubic foot of the gas, therefore, weighs a trifle less than 1206 grains, and it takes 603 grains of sulphur and a cubic foot of oxygen, representing five cubic feet of air, to produce it. Its chief characteristic is its powerful odour; for as little as one part or volume of the gas in 100,000 volumes of air is readily discoverable by the nose; nine parts of it in 100,000 of air are disagreeable, and provoke coughing; twenty parts of it in that quantity of air are powerfully irritating; and forty-three parts of it in 100,000 of air, or rather more than four parts in 10,000 of air, are actually irrespirable, and a much smaller quantity than this will rapidly kill plants. Water absorbs from forty to fifty times its bulk of the gas, and produces a solution of powerful antiseptic and disinfecting properties. The same is the case with the combinations of the acid with alkalies forming the sulphites and bisulphites.

2. The Organic Acids—as *Carbolic, Cresylic, Acetic, Picric,* and *Benzoic Acids*—are all disinfectant and antiseptic. According to Dr. Dougall, the most powerful of them is benzoic acid, for as little as one part of it in 533 of water will prevent the appearance of infusorial life, whereas as much as one part of acetic acid in 125 of water is necessary for this purpose. Carbolic acid occupies an intermediate position, for it requires one part of the acid in 267 of an organic solution to arrest the development of animalcules for six days; moreover, according to Dr. Dougall, the addition of one part of carbolic acid to 200 parts of a solution swarming with infusoria had no injurious action on them, although the like proportion of picric or benzoic acid was immediately fatal to them. So also with respect to vaccine lymph: air saturated with the vapour of carbolic acid at ordinary temperatures had no destructive effect on its vitality after exposure thereto for twenty-four hours; and even when mixed with the lymph in the proportion of 1 per cent., and allowed to dry, the activity of the virus was not impaired. Pettenköfer, indeed, has shown that although carbolic acid will arrest the development of ferment cells, it does not destroy their vitality; for if after such treatment they are freely diluted with water, they again start into

activity. Its antiseptic power, however, is evidently great; for, according to Dr. Crace Calvert, the presence of one part of the acid in 1000 of an organic solution will check decomposition and prevent the appearance of vibrio or fungus life for more than forty days. At the Morgue in Paris, where the acid has been freely used, Dr. Devergie found that in hot summer weather one part of carbolic acid (No. 5, which contains 85 per cent. of carbolic and cresylic acids) in 1900 of water freely applied to the dead bodies completely prevented putrefaction; and even when diluted to the extent of one part in 4000 of water the effect was most marked. In my own experiments in the city of London I have noticed that a very small quantity of carbolic acid in the sewers prevented decomposition, and that a solution of 1 per cent. of it upon meat arrested putrefaction.

Specimens of the acid are upon the table, there being several varieties of it in commerce for different purposes. The pure acid is a camphor-like solid, which fuses at 95° F., and boils at 366° F., the boiling point of cresylic acid, with which it is commonly associated, being 397°. It is not very soluble in water—only to the extent of about 3 per cent.—but it is freely soluble in alcohol, ether, and glycerine. It has no acid reaction on litmus paper, although it combines with the alkalies to form salts. A good test, indeed, for the purity of carbolic acid is the solubility of five parts of it in one part of caustic soda dissolved in ten of water. You have seen its powerful coagulating action on albumen, and I hardly need say it is an energetic caustic.

The commercial preparations of it are—1, the pure crystals for medical use; 2, the fluid crystals of the British Pharmacopœia strength for surgical purposes; 3, the loose crystals for disinfection; and No. 4 and No. 5 for commoner purposes. The last-named variety, as prepared by Messrs. Calvert and Co., is guaranteed to contain 85 per cent. of carbolic and cresylic acid, free from tar oils and sulphuretted hydrogen, and this is well suited for all the commoner kinds of disinfection. It may be used in the proportion of half a pint of the acid to two gallons of water, and if the odour is objectionable, the purer quality, No. 4, may be employed. Other preparations of it are "*the powder*" (carbolate of lime), which should contain at least 15 per cent. of acid as shown by the neutralisation of the lime with hydrochloric acid: "*McDougall's fluid carbolate*," which is the acid in neutral combination; "*Cliff's antiseptic liquid*," which is a solution of the acid in soft soap; "*Westerton's patent, zymotic fluid*," which is a mixture of carbolic acid, pyroligneous acid, and ether, with a little scent;

and there are several kinds of carbolic acid and coal tar soaps. But it is best to avoid these nostrums and rely on the action of the pure or nearly pure acid.

3. The Alkalies—*Lime, Potash, Soda,* and *Ammonia*—are not very powerful disinfectants unless they are used in a somewhat concentrated state, when they are useful for detergent purposes and for the destruction of organic matter. Cream of lime, for example, as well as a strong solution of potash and soda, may be advantageously employed in cleansing rooms, stables, cattle-sheds, slaughter-houses, &c.; and powdered lime, sprinkled freely about cellars, church vaults, cattle lairs, &c., will absorb moisture, carbonic acid, &c., and help the oxidation of organic matters. Added to sewage in the proportions of from ten to twenty grains per gallon, it combines with the carbonic and phosphoric acids, forming a flocculent precipitate which rapidly subsides, and carries with it all suspended matters as well as a notable proportion of soluble organic matter. It likewise kills the infusoria of the sewage, and checks the decomposition of it for several days.

4. The Haloids.—The most important of these are *Iodine, Chlorine, Chloride of Lime, Chloride of Zinc, Chloride of Aluminium* (*Chloralum*) and *common Salt*. *Iodine* is not of much practical importance, although it has been recommended for use in the sick-chamber. *Chlorine,* however, is a powerful disinfectant, and has been used with considerable success from the time (1791-92) when Fourcroy, the distinguished French chemist, proposed it as a fumigating agent. It is easily prepared by adding black oxide of manganese to strong muriatic acid—using about a quarter of a pound of the former to half a pound of the latter in a basin or dish,—frequently stirring the mixture, and, if possible, heating it. It is also produced by the gradual addition of muriatic acid to permanganate of potash (Condy's fluid); and this, indeed, is very like the preparation now advertised under the name of *chlorozone*—the muriatic or hydrochloric acid having been added in comparatively small proportion. Chlorine is a heavy gas, its specific gravity being as nearly as possible two and a half times that of atmospheric air. It is extremely irritating, and, like sulphurous acid, cannot be effectively and safely used in the sick-chamber except for sweetening the air, as the quantity necessary to disinfect is irrespirable. The same is the case with chloride of lime, when its acid (hypochlorous) is set free by carbonic or muriatic acid, as it must be to become an effective aërial disinfectant. In proper proportions, however, both of these agents are powerful disinfectants, as they not only check putridity and the development of animalcules in organic solu-

tions, but they also kill such creatures when added in the proportion of about 4 per cent., and they destroy the vitality of vaccine lymph. Like other agents which favour oxidation, they actually promote decay and the generation of infusorial life when used in small proportion. To disinfect with chlorine, therefore, or with hypochlorous acid, the chamber must be vacated, so that the air may become charged with at least 1 per cent. of these agents, and then the destruction of the miasm or contagium is insured. A solution of chloride of lime in the proportion of one pound to two gallons of water (5 per cent.) is useful for washing floors, &c., but it must be used cautiously for the disinfection of clothing, as solutions of this strength act injuriously on animal tissues, although they are not so hurtful to vegetable fibres.

Chloride of Soda (Labarraque's liquid) is a compound homologous with chloride of lime, and it enters into the composition of Watts's chlorinated soap; but, as it rapidly undergoes decomposition, the antiseptic power of the soap is *nil*.

Chloride of Zinc (Sir William Burnett's fluid) is a liquid which ranges from 1309 to 1594 of specific gravity—the former containing about 30 per cent. of the chloride, and the latter about 55. Its action is evidently due to its power of coagulating albumen, and of absorbing ammonia and sulphuretted hydrogen. Used in the proportion of one part of the chloride to 300 of water it instantly destroys infusorial life, and even when diluted so as to contain but one part in 1000 of an organic liquid it checks decomposition, and prevents the appearance of animalcules and fungi for more than forty days. Its chief use, however, is as a disinfectant of fæcal matters; for it has no power as an aërial disinfectant, and is too corrosive in its action for textile fabrics.

Chloride of Aluminium or *Chloralum*, which is a solution containing about 15 per cent. of the salt, appears, from the researches of Dr. Dougall, to be powerfully antiseptic, for when used in the proportion of only one part of the substance to 933 of water it prevented the development of animalcules for six days. Dr. Crace Calvert also found that an organic solution containing one part of chloralum in 1000 of the solution did not exhibit vibrio life until after ten days. In another experiment, however, with albumen and starch-paste—each containing 2 per cent. of the substance—decomposition with offensive odour began in nine or ten days; and in my own researches I found that putrefactive decomposition could not be prevented with less than four per cent. of the substance. In the illustrations before you, you will notice how ineffective it is in checking putrefactive decomposition.

Moreover it is not an aërial disinfectant, and is therefore worthless in a sick-room; and with regard to its deodorising power it manifestly does not contain anything which is capable of absorbing putrid miasms. Like common alum, however, and crude sulphate of alumina, it is a good precipitating agent for sewage, and when combined with the action of lime it thoroughly defæcates such matters.

5. Mineral Sulphates—as *Sulphate of Zinc, Sulphate of Iron, common Alum,* and *Sulphate of Copper,* as well as the waste solutions of metallic salts from wire-working, iron-galvanising, lacquering, &c., are useful disinfectants when the object is to coagulate albuminous matters and to destroy living organisms, as well as to neutralise offensive miasms. Each of these substances will prevent the manifestation of infusorial life in organic solutions containing from one to four parts of the salt in the 1000; and a solution composed of from one to two pounds of the substance in a gallon of water is a good disinfectant of drains and of fæçal matters directly they are discharged from the body. Mudie's disinfectant is sulphate of iron or green copperas, which is the cheapest of all these substances. None of them, however, can be advantageously used as aërial disinfectants, as they are not in any case volatile.

6. *Permanganate of Potash* and *Chlorozone* are both oxidising agents, and do not appear to exert much action on vitalmanifestations, but they are very active in the destruction of dead organic matter. The use, therefore, of these agents in the sick-room as disinfectants is altogether fallacious, for we have no reliable evidence of their power of destroying contagia. The sheet, indeed, saturated with Condy's fluid, which is recommended to be hung up in the sick-chamber, will quickly, like other dead organic matter, decompose the fluid and render it inert. This property, however, of attacking and oxidising dead and decaying organic matter gives it value as a means of purifying potable water, and for this purpose it is alone useful. The same may be said of chlorozone, for the small quantity of free chlorine present in it is not capable of much energy of action.

7. The Volatile Oils—as *Camphor, Turpentine,* &c.—are probably effective to some extent, for we not only perceive that they hinder the development of animalcules and fungi, but they also generate ozone; for ages, indeed, these substances have enjoyed a high reputation as trustworthy disinfectants and deodorisers. They are the correctives universally employed in religious worship, and from time immemorial they have entered into the composition of the

ointments of the high priest and the incense of the altar. Among eastern nations the practice of fumigating the house with costly spice and rich-smelling drugs has been contemporaneous with history. During the middle ages, when the plague, the black death, and the sweating sickness decimated the cities of Europe, immense importance was attached to these agents as disinfectants. The advice of the learned Dr. Caius, who wrote of the sweating sickness in 1552, was to "have always your handkerchief perfumed with a mixture of spices for your nose and your mouth, both within your house and without, and in your mouth a piece either of setwel or of the root of *Enula campana* well steeped before in vinegar roseate, or a mace, or berie of juniper. In want of such perfumes, as before said, take of myrrh and dried rose-leaves, of each a like quantity, with a little frankincense, for the like purpose, and cast it upon the coals, or burn juniper and their berries." Until very recently, too, the practice in our criminal courts was to lay a bunch of rue on each side of the prisoner, to prevent the spread of contagion brought from the infected gaol. Now, it is a curious fact, as I will show you experimentally, that the oxidation of perfumes and volatile oils is generally accompanied with an active ozonisation of the atmosphere; indeed, Professor Paolo Mantegazza, of Pavia, who has carefully investigated this subject, says that this is is a very convenient method of obtaining ozone: for under the influence of light (especially solar light) and air the essential oils, even in small quantities, will ozonise comparatively large proportions of atmospheric oxygen. It may well be, therefore, that the volatile oils and essences deserve the reputation they have so long enjoyed as purifying agents; and that the recommendation of Empedocles, to plant aromatic and balsamic herbs about your house as preventives of pestilence, is supported by scientific as well as empirical facts. Moreover, as benzoic acid is a large constituent of the incense used in the Latin and Greek churches, it is possible, looking at its antiseptic powers, that this also may be useful as a disinfectant.

8. Charcoal and other Porous Substances are powerful oxidising agents, and they owe their action to their property which they possess of condensing upon their surface and within their pores large quantities of vaporous and gaseous matter, which by the very force of condensation they bring into contact with atmospheric oxygen, and thus by a process of slow combustion burn up organic miasms almost as thoroughly as if they were passed through the ignited coals of a furnace. In the case of wood charcoal it will absorb about

nine times its volume of oxygen, and ninety times its volume of ammonia.

This property of absorbing offensive effluvia was described by Löwitz, a German chemist, at the close of the last century, and in 1805 Giraud proposed to use it as a means of disinfecting night-soil. In 1814 the subject was further investigated by Theodore de Saussure, who ascertained the exact volumes of different gases and vapours which wood charcoal would absorb. Since then, the qnestion has been further explored by Figuier, Bussy, Thenard, Allen, and Pepys, Count Morozzo, and others; but it was not until the year 1853 that the facts of the inquiry began to acquire practical importance. In that year Dr. Stenhouse, pursuing an experiment of Mr. John Turnbull, of Glasgow, found that putrid organic matters, when covered with a layer of charcoal, were free from offensive smell, notwithstanding that they putrified and decayed with more than usual activity.

Let me give you some experimental illustrations of this.

Now, the sole condition which is necessary to this is the free access of atmospheric air, which the charcoal uses in oxidising the putrid miasms. It is useless therefore to expect a beneficial action of the charcoal unless it can obtain oxygen; but getting this it will carry on its *eremacausing* power for an indefinite time. The applications which have been made of this power are numerous:—1. There is the respirator of Dr. Stenhouse, which arrests putrid miasms, and enables us, as I know from experience, to work comfortably in the most filthy atmospheres. 2. There is the air-filter, which I shall presently describe as applicable to the purification of the air of sewers, &c. 3. There is the charcoal water-filter, which, with water containing oxygen or worked intermittently, will purify water from the foulest matters. Other applications of it will occur to us presently, but I beg of you to remember that as the action is entirely dependent on the free access of oxygen, it is folly to expect that charcoal will act as a deodoriser or disinfector when this agent is shut out. It has therefore failed to disinfect sewage when used continuously as a filter for that purpose.

Again, everyone is familiar with the purifying power of common earth; the graveyards, indeed, of every large city, testify to the enormous quantity of organic matter which may be disposed of through its agency; and looking at the magnitude of the subsoil filth of this city, it is surprising how little it has affected the virgin gravel a few feet below the surface. All this is referable to the catalytic action of the porous soil, whereby the countless tons of decomposing mat-

ters have been oxidised and converted into harmless nitrates, which abound in the city wells, and which might, in case of an invasion, furnish our volunteers with abundance of "villanous saltpetre."

9. Air and Water are likewise powerful agents of destruction, and show their beneficial action in the one case in the effect of good ventilation, and in the other in the disintegration of organic substances as they flow along in our polluted rivers—thus giving them the means of rapid self-purification. A heavy storm of rain, too, is a great purifier of the air, and is often the turning-point in the progress of an epidemic; but besides this, water, by reason of its endosmic action, is inimical to the corpuscular structures of many specific contagia, and, by bursting their cell-like envelopes, destroys their vitality.

10. Disinfection by Heat.—The power of fire as a disinfectant is well known, and has been recognised from the remotest time. The sacrificial altars of early nations were the rude methods by which this agent was employed; and so fully did the ancients believe in its salutary effects, that in time of pestilence it was often resorted to as the only effective means of purifying the air. Caius, in his "Boke of Counseill against the Disease commonly called the Sweate or Sweating Sickness, in 1552, advises the use of "fyres either in houses or chambers, or on that side the cities, townes, and houses that lieth toward the infection and wynde commyng together, chefely in mornynges and eueninges, either by burnyng the stubble in the felde or windfallynges in the woodes, or otherwyse at pleasure. By which pollicie," he says, "skilful *Acron* deliuered Athens in *Gretia*, and diuine *Hippocrates abdera in Thratia* frō ye pestilēce, and preserued frō the same other the cities in *Greece*, at diverse times cōying with the wynde frō *Ethiopia*, *Illyria*, and *Pæonia*, by puttyng to the fyres wel smelling garlādes, floures, and odoures, as *Galene* and *Soranus* write. Of the like pollicie for purgyng the aier were the bonfyres made (as I suppose), fro long time hetherto vsed in ye middes of summer, and not onely for vigiles." In the popular mind there has always been a notion that the plague of London was exterminated by the Great Fire.

The temperature at which infectious matter is rendered inert has lately been a subject of keen controversy, chiefly in relation to the temperature at which the vitality of living germs and minute infusorial creatures is destroyed. The late Dr. Henry, of Manchester, demonstrated experimentally that the vitality of vaccine matter is destroyed at a temperature of 140° Fahr., and that the virus of scarlet fever is inert after

being exposed to a heat of 204° Fahr.; but some of the lower organisms appear to be more tenacious of life, for, according to Dr. Crace Calvert, the common vibrio will bear a temperature of nearly 300°, and his black vibrio, which appears to be a very salamander of animalcules, is not killed by a heat of less than 400° Fahr. After a long investigation, however, before the Académie des Sciences of Paris, it was unanimously agreed by all parties to the controversy of spontaneous genesis that none of the lower organisms or their germs would resist in air a temperature of 130° C. (= 266° Fahr.), and in liquid a temperature of 110° C. (= 230° Fahr.). This, indeed, was the temperature fixed by Pasteur himself, although many of the members thought that 100° C. (= 212° Fahr.) was sufficiently high to destroy all vitality. In most cases, in fact, a temperature of 180° Fahr. is sufficient to destroy infusorial life, for that will coagulate albumen, of which they are made. Assuming, however, that it is desirable to use as high a temperature as possible for disinfection, it is important to know what is the effect of heat on textile fabrics. Up to a temperature of 250° Fahr. most of these fabrics are unchanged, unless the exposure is maintained for many hours, when they become discoloured and slightly brittle. Above this temperature the change is more marked, and with a dry heat of 300° Fahr. cotton fabrics are slightly changed, and, therefore, spoilt. At 490° they become dark brown, and crumble into powder when rubbed. At 500° gaseous hydrocarbons are produced, and at 600° all vegetable and animal tissues are converted into charcoal, with the evolution of empyreumatic oil and gas. It would seem, therefore, that for practical purposes a heat of 250°, aided by a jet of steam, for the purpose of diffusing the temperature and helping its action, may be safely applied to textile fabrics.

In the case of noxious vapours, however, as the fetid effluvia from tallow-melting, bone-boiling, soap-making, &c., the organic miasms must be destroyed by actual combustion, and to this end they must be conveyed into and through a large body of fire. In many cases it is necessary to remove aqueous vapours from the miasms by means of a scrubber or condenser before they pass to the fire, and in all cases the products of their combustion should be conveyed into a tall chimney-shaft, in order that a good draught may be secured for their delivery to the fire.

The employment of heat for disinfecting purposes should be taken advantage of on all possible occasion. Foul linen from the sick-chamber should be immediately boiled in water or steeped in boiling water. Milk, whether tainted or not,

should always be boiled before using; and in cases of suspicion as to the contamination of drinking-water, it should be boiled and filtered through animal charcoal, for there is no reliable evidence that any of the common agents of infection will resist a temperature of 212° Fahr. applied for a few minutes. Lastly, meat should be thoroughly cooked, so as to destroy parasitic and other infection.

And now, having broadly examined the several powers and modes of action of the leading disinfectants, we will briefly consider the way in which they may be most advantageously applied, taking as examples the common cases which present themselves in actual sanitary practice.

First and foremost of these cases is *the disinfection of the sick-chamber and of the articles contained therein.* This is avowedly a difficult matter, for the presence of the sick person and his attendant prevents the use of volatile or aërial disinfectants in such quantity as to be of undoubted service; chlorine, for example, or hypochlorous acid, or sulphurous acid, or carbolic acid vapour, must be present in the atmosphere in the proportion of at least one part per 1000 to be effective, and in this proportion they are so irritating as to be irrespirable. While, therefore, the room is oocupied by the living, we must rely on other means of disinfection and immediate destruction of tainted articles. Matters discharged from the body should be received in a vessel containing active disinfectants, as about half a pint of either of the following solutions, namely :—A solution of two pounds sulphate of iron (green copperas) in a gallon of water (= 20 per cent., specific gravity 1096); or a solution of one quart of chloride of zinc (Sir William Burnett's fluid) to three quarts of water (= about 8 per cent. solid chloride, specific gravity 1077); or a solution of four fluid ounces of carbolic acid (Calvert's No. 5) to a gallon of water (= 2·5 per cent.). All articles of clothing, bedding, &c., should be boiled in water or plunged into boiling water before they are taken from the rooms, and in addition to this they should be steeped in a solution of carbolic acid of the above-mentioned strength. Special agents of infection—as the desquamated cuticle in scarlet fever, and the phagedenic discharges of ulcers and foul wounds or sores—should be the subjects of constant attention; pomades and other matters being freely employed to the surface of the body in the former case, and antiseptics and disinfectants in the latter. Besides this, all superfluous articles of furniture, as carpets, curtains, &c., should be removed from the room early in the case, and free ventilation and the utmost cleanliness should be always prac-

tised—everything like soiled rags, dressing, &c., being immediately burnt. As regards the use of aërial disinfectants, I am inclined to think that acid vapours are the most effective —as chlorine, or chloride of lime, or acetic acid,—for these only are capable of destroying the vitality of vaccine lymph, and, therefore, by inference, of other contagia; besides which, they sweeten the atmosphere, and render it more pleasant for respiration.

When, however, the room is vacated, disinfection of it may be practised with the most perfect success. In the first place, all the articles contained in it should be spread out, so as to receive freely the sulphurous acid fumes which are to be generated therein; and, having closed the windows and stopped up as completely as possible every aperture and outlet from the room, measures should be taken for producing the needful quantity of sulphurous acid. This should not be less than 1 per cent. of the air of the apartment. Now, as a cubic foot of sulphurous acid is produced from 603 grains of burning sulphur, it is evident that every 100 cubic feet of space will require at least this quantity of sulphur for disinfection. To be certain of the results, however, it is advisable to use the sulphur in slight excess—say an ounce and a half for every 100 cubic feet of space. The sulphur may be safely burnt in a shallow pipkin or coarse earthenware saucer containing some live coals or a little bisulphide of carbon; in fact, this latter compound, if accessible, is the best form in which the combustion of sulphur can be effected, for it contains about 84 per cent. of sulphur, and is very combustible. The pipkin or saucer should be supported upon a pair of tongs laid across a pail of water, so that in case of accident the burning sulphur may fall into the water and do no injury. After a period of six or eight hours the room may be opened for ventilation and the several articles be spread out for an airing, or taken to the disinfecting chambers for still greater safety. The floor and painted parts of the room should be then thoroughly cleansed and the ceiling treated with lime-wash.

2. *Infected Clothing and Bedding* should be subjected to a further process of disinfection in the chambers provided by the local authorities for that purpose. These are a room or chamber for exposure to the concentrated fumes of burning sulphur (from 4 to 5 per cent. of them in the air); and next a chamber for disinfecting and for killing parasites by heat. This should be so constructed that its temperature can be well regulated and maintained (at from 240° to 250° Fahr.) for four or five hours. It should be self-regulating and self-

registering in this respect, and, therefore, be easily managed The apparatus in use in the City of London for this purpose was constructed by Mr. Leoni, and is very effective in its action, for during the last two years we have disinfected 2583 articles of clothing, bedding, &c., with the most perfect success. In fact, during the recent epidemic of smallpox nearly 2000 articles were thus treated, and I am not aware of a single case in which it was not successful. This accords with the experience of the several smallpox and fever hospitals of London, and shows that, whatever may be the effect of such treatment with Dr. Crace Calvert's black vibrio, it is abundantly efficacious in the case of common contagion, be the virus what it may.

3. *Treatment of Dead Bodies.*—This is a matter which frequently demands attention, as when bodies are kept in rooms occupied by the poor, or are brought to the mortuary for safe custody. I have already told you that carbolic acid has been most successfully employed by Dr. Devergie of the Morgue in Paris for the preservation of the dead. As little as one part of the acid in 2000 of water, freely applied to the corpse, will prevent putrefaction, A sheet, therefore, saturated with a solution of one per 1000 of the acid and applied to the body will preserve it. So also will a couple of pounds of good carbolate powder, containing 15 per cent. of carbolic acid, placed in the bottom of the coffin. Metallic salts also will preserve the dead, and in some cases they are preferable to carbolic acid, as they are without odour; thus sawdust, nearly saturated with a solution of chloride or sulphate of zinc (specific gravity 1077), may be placed around and over the corpse when in the coffin, and in this manner decomposition will be arrested.

I might here mention that the diseased and putrid meat seized in the City, amounting to nearly two tons per week, is disinfected with crude carbonic acid before it is sent away from the market; and this not only prevents decomposition, but it also prevents the use of the meat for improper purposes.

In the case of old burial-grounds which are offensive, as well as church vaults, the best means of disinfection is the covering of the ground with fresh earth to the depth of several inches, and the planting of trees and sowing of grass. In this way we have dealt successfully with the city grave-yards, twenty-six in number, covering a superficial area of about 48,000 square yards, in which, according to a moderate computation, there are at least 48,000 tons of human remains. Church vaults should be disinfected by first opening the vaults, exposing them freely to the external air, and throwing

into them a quantity of quicklime. The coffins should then be rearranged crosswise like bricks in a building, and filled in with dry earth or mason's rubbish, with which about 5 or 10 per cent. of vegetable charcoal has been mixed. Ventilation should then be brought into connection with the vaults by means of an upcast and downcast shaft of the size of a rain-water pipe, and the whole closed in. In this manner in 1860 the late Mr. Grainger and myself proceeded to disinfect all the vaults, amounting to 250 in number, of the seventy-one City churches. These vaults contained the coffins and remains of many thousand dead bodies—at least 11,000—in a very offensive condition; and the effect of it has been most successful. When bodies are removed from the vaults to other places of burial they should be enclosed, coffins and all, in cases containing carbolate of lime powder in good quantity.

4. *Sewage and Sewer Gases.*—The best disinfectants of sewage are the mineral salts, as the salts of iron and alumina in conjunction with lime. Ordinary sewage subjected to the action of from one to two parts of each of these agents per 7000 of sewage is immediately disinfected, the flocculent matters being rapidly precipitated, leaving a clear supernatant water which may be safely distributed upon land, or allowed to flow into a running stream of moderate volume—as from ten to twelve times that of the defæcated sewage. So effective is this operation that it ought to be universally applied to the sewage of towns when it is not discharged into the sea. The matters of cesspools and privies require the application of large quantities of metallic salts—the best being sulphate of iron (green copperas) or chloride of zinc—either of which should be used of the specific gravity of about 1·100.

Sewer gases are easily disinfected by vegetable charcoal in the manner already explained—the charcoal being placed upon trays in boxes which are situated in the course of the ventilating shafts from the sewers or drains. Many years ago I advised the adoption of this plan in the City of London, and there is a larger district, eastward of Bishopsgate Street, where all the sewer ventilators are fitted with charcoal air-filters. The district is in the filthiest quarter of the City; it contains 1700 houses, occupied by abont 14,000 inhabitants, and the total length of the sewers of the district is about 25,587 feet. Along these there are 104 air-shafts fitted with these ventilators, 265 trapped gullies, fifteen flushing tanks, and twenty-six side entrances. The air-filters consist of an iron box eighteen inches deep and fourteen inches square, containing a movable frame of six trays or sieves, upon each of

which there is a layer of wood charcoal, in pieces as large as filberts, about two inches deep. Our experiments were commenced in 1860, and they have been maintained with perfect success until the present time, for they are still in action. I have repeatedly submitted the charcoal from the ventilators to chemical examination, and have always found that it contained abundance of nitrate, together with a peculiar alkaline salt of a nitrogenous nature with associated hydrocarbon. These ventilators are best fixed where they are protected from actual wet, as against the sides of houses, or in the course of shafts or pipes carried up from the soil-pipe of the closet. In such situations their action is continuous for many years, and they should always be thus used where foul gases escape from the soil-pipe, the drain, or the closet of a house. Air-filters of this description have been adopted and applied with more or less success by Mr. Rawlinson, Mr. Baldwin Latham, and Mr. Bazalgette.

5. *The Offensive Gases and Infected Air* of noxious and unwholesome trades are easily destroyed by fire—there being contrivances for conveying the foul gases first through scrubbers or condensers and then into the back part of the ash-pit of the furnace fire. In this way moisture and other condensable matters are removed, and the residual gases and vapours are consumed by the glowing fire through which they must pass before they reach the chimney-shaft. By carrying the vapours to the back of the ash-pit of the furnace we insure their combustion, for when the ash-pit door is closed (as it ought to be) the draught is so powerful that it draws the vapour from the chamber or boilers in which they are generated, and forces them through the furnace fire.

In some cases the air becomes so loaded with minute particles of dust, &c., as to be extremely irritating. This is so in cotton mills, and with flock workers, feather cleaners, stone and steel grinders, chloride of lime makers, millers, firemen, &c. The remedy for this is easy, for a pocket-handkerchief over the face or a respirator packed with cotton-wool will shut out all noxious solid particles—in fact, the power of cotton-wool is so great in arresting the minute particles of matter, germs and others, which float in the atmosphere, that, according to Professor Tyndall, it is capable of producing an atmosphere absolutely free from dust, which will bear the severe test of his electric beam. Schroeder and Pasteur say that air filtered through cotton-wool is deprived of the power of producing infusorial life. Here is an experiment which is very striking in this particular: In these flasks I have a supersaturated solution of sulphate of soda, which, while in a state

of active ebullition, was closed with a plug of cotton wool, and in this state it has been allowed to cool. Atmospheric air, of course, has entered the flasks to take the place of the condensed stream, but in so doing it has been strained by the wool, and the solution has failed to crystallise. When, however, I remove the plug of cotton-wool, you will remark that the liquid instantly becomes solid, in consequence of the rapid formation of a mass of crystals. This is no doubt due to the falling in of a few particles of atmospheric dust, which were floating by at the time of withdrawing the cotton plug, and which became immediately nuclei for the growth of the crystals.

A still better respirator than cotton-wool is that of Dr. Stenhouse, which consists, as I have said, of a layer of granulated charcoal. Here is one of them, which I have used successfully on many occasions when conducting analyses of putrid matter in cases of suspected poisoning. Attempts have been made to keep down the dust of the public thoroughfares by means of deliquescent salts put into the water-carts; but such contrivances are exceedingly dangerous to tradesmen's goods, when in certain states of the atmosphere they become dry, and are blown with the dust into the shops, and settle upon the goods, for, at the outset of damp weather, they absorb moisture from the air, and spoil the goods. Cooper's patent in this country, and Marcus's in America, are illustrations of this. They are solutions of common salt and chloride of calcium in water, the gravity being from 1040 to 1085. They have been tried in America and on the Continent, but have failed.

6. *Shambles, Slaughter-houses, Cattle-layers, &c.*, should be kept sweet and wholesome by strict attention to cleanliness, and by the frequent use of cream of lime, with a little chloride of lime as whitewash.

7. *Breweries, Brewing Utensils, and Distillers' Vats* are easily and effectively cleansed and disinfected by means of sulphurous acid or a strong solution of bisulphite of lime, aided in the case of fungoid casks by a jet of steam.

Lastly, the purification of *Water* is insured by a few drops of permanganate of potash solution (Condy's fluid) or of chlorozone—leaving them to act for a few hours, and taking care that the pink colour is distinctly maintained to the very end of the process. Boiling the water for several minutes, and, after allowing it to cool, filtering it through animal charcoal, is also a safe method of disinfection. The filters of the London and General Water Purifying Company are admirably adapted for this purpose, as they contain a large volume of

charcoal, which can be aërated by intermittent filtration. I find, indeed, that water thus filtered is absolutely free from organic taint, looking blue like distilled water when examined in large volume, as in a glass tube two feet in length; and the action of the filter is so enduring that it is maintained in the case of ordinary water for more than a year.

And now, gentlemen, in leaving the subject and inviting you to a discussion of it, I have only to say that I have carefully avoided a controversial treatment of it, not merely in respect of the possible or even probable causes of contagion; but also in respect of the many kinds of disinfectants which are daily advertised for public use. It is true that most if not all of these have come under my observation, and have been the subjects of experiment; but I have not dwelt on this, for my principal object has been to show you what, in my individual experience, I have found to be the most effective means of dealing with the several kinds of infection which almost daily occur in our sanitary practice.—*Medical Times and Gazette.*

CENTRAL VETERINARY MEDICAL SOCIETY.

The ordinary monthly meeting was held on Thursday, December 4th, at 10, Red Lion Square; the President (F. J. Mavor, Esq.) in the chair.

Mr. Gowing, sen., laid before the meeting a morbid specimen from a retriever dog which had been sent to him to have a tumour removed from the ribs. He found, on examination, that the mass was so blended with the costæ, that it was impracticable to remove it, so he sent back the dog without treatment. During the next three weeks it was sent twice more to him, and then destroyed, after which the integument was divided longitudinally and the tumour dissected out, when it was found that several ribs were fractured, and extensively diseased. There was evidence of pleurisy having existed, and the lungs had assumed a tuberculous character, at first sight appearing scrofulous. Unfortunately, no microscopical examination had been made, and the parts were then too much decomposed. The dog's breathing had been scarcely altered, and before Mr. Gowing saw him, the tumour had been treated with iodine.

The parts exhibited were closely examined, and some time devoted to the case.

The President then adverted to his previous proposition of forming a number of committees for special purposes connected

with the objects which the Society had in view. A long discussion ensued, the suggestions being favorably received, and, with a few amendments, ultimately were carried.

As the evening was now somewhat advanced, and the President's paper on the action of medicines unread, it was decided by the casting vote of the President to postpone the reading of the same till January 8th, and the better to afford a good discussion, to send a copy of it to the *Veterinarian*, so that it might appear beforehand.

Present—16 Fellows, and two visitors.

JAMES ROWE, jun., *Hon. Sec.*

ON THE ACTION OF MEDICINES.

By Mr. MAVOR.

Gentlemen, most of you are aware that I have for some years been experimenting on animals with the object of ascertaining the physiological action of various drugs. The result of some of these experiments I have communicated to this society from time to time, but I have now to show what benefit is to be derived from these researches.

In the first place, I start with the assertion that all non-nutritious substances introduced into the animal system are eliminated there from by some special tract, and in their passage through the body they influence special tracts, in virtue either of their chemical, physical, or dynamical properties, each drug producing a train of symptoms peculiar to itself. Moreover it is my firm belief that the physiological action of a drug is a key to its therapeutic value, for while a toxic dose will effect such changes in a part as to unfit it for any vital action, a lesser dose, applied to a diseased part, will, by removing that state of combination of the elements which excited diseased action, enable the normal process of nutrition to restore the healthy constitution.

We find that volatile agents, such as camphor, ether, turpentine and some of the oleo resins, &c., are eliminated to a great extent by the lungs, and in their passage through them influence the secretion of the bronchial mucous membrane. Again, various soluble salts and volatile oils, &c., are eliminated by the urinary tract, and influence the secretion of urine. Others, again, are eliminated by the alimentary mucous membrane, and influence the secretion of this part; hence, we find that in all cases, whatever the quantity given, it will tend to pass out by some special tract, but the range of symptoms produced will vary according to the state of the part and the quantity given. Therefore when we know by what special tract any agent will pass out, and what symptoms it

will produce in a physiological dose, we know what agent to employ in the treatment of derangement of the function of this special part, only remembering to give it in a less quantity than will produce the physiological effects.

In fact, the theory I have deduced from my experiments may be shortly expressed thus :—

1st. Each drug exerts a primary action on some *special* tract.

2nd. That the physiological action on this part in health is one thing, and

3rd. That the therapeutic action on this part in disease is another and different thing.

For instance, digitalis given in a physiological dose to a healthy animal causes violent and irregular contractions of the heart, which soon end in a cessation of movement, yet the same drug given in a less dose to an animal suffering from a dilated and weak heart tends to increase the contractile power of that organ ; again, turpentine, which in a physiological dose causes hæmaturia and suppression of urine, will in a less dose be found useful in cases of hæmaturia and suppression of urine, and this simply by its topical action in the process of elimination.

Arsenious acid exerts its influence when given in physiological doses upon the mucous membranes and skin, and experience has long since shown that we possess no more valuable remedy in the treatment of derangement of these tracts—such as the various skin diseases, diarrhœa, dyspepsia, conjunctivitis, bronchitis, chronic catarrh, &c. I have here said sufficient to indicate the theory I hold, and I must refer to a work now in the press, by myself and Dr. Burness, for a full discussion of this theory and its practical application to the treatment of disease.

I now pass on to detail a few experiments showing the physiological action of certain drugs ;

(A).

	Pulse.
At 5 p.m., gave to a dog subcutaneously gr. $\frac{1}{2}$ morphia	70
5.40 p.m., dog drowsy ; increased flow of saliva .	68
6.15 p.m., very sleepy ; saliva dropping from mouth	60

(B).

At 4.50 p.m., gave to a dog gr. $\frac{1}{2}$ morphia subcutaneously	70
6.50 p.m., sleeping ; saliva dropping from mouth ; unable to rise on hind legs . . .	70

(C).

At 5.10 p.m., gave to a colt subcutaneously 12 gr. morphia	70
5.30 p.m., muscular twitching.	
5.45 p.m., general restlessness, delirium, and slight perspiration	70

	Temp.	Pulse.
7 p.m., still the same.		
Next day, 4 a.m., symptoms abating.		
11 a.m., quite well.		

(D).

At 10 a.m., gave 4 gr. morphia to a horse subcutaneously . . .	$99\frac{4}{5}$	36
12.20 a.m., pupils dilated . .	101	64
2.40 a.m., very restless and excited; tongue moist	$100\frac{3}{5}$	56
4.10	$100\frac{2}{8}$	56
6.20	$100\frac{2}{5}$	50
Next day, 10 a.m., quite recovered . .	$99\frac{2}{5}$	56

(E).

At 10.30 a.m., gave to a horse 4 ounces of tincture of Datura Tatula . .	$99\frac{4}{5}$	34
12.30 a.m., pulse small and soft, tongue and bursal membranes dry; hacking cough at intervals; nasal membranes and conjunctivæ still moist; twitching of facial muscles . . .	$99\frac{4}{5}$	32
3.40 a.m., pupils dilated; tongue dry; grumous discharge from nose . .		36
5.30 a.m., pulse soft; respiration 10; shallow sighing at intervals; tongue moist; pupils contracting . .		36
6 p.m., dunged; effects passed off .	$100\frac{3}{5}$	

One fiftieth of a grain of aconitine was given subcutaneously to a horse with the following symptoms:

Small, irregular pulse; dry mouth; head drooping, followed by increased secretion of saliva, contraction of the pupils; pulse small, soft, and 50; loss of power of hind legs especially; horse restless; twitching of muscles of chest and abdomen; fæces passed solid.

$\frac{1}{50}$th of a grain of atropine was given subcutaneously to a colt at 3.10 p.m. .	8	55
At 4.20 p.m., paralysis of nasal muscles .	5	
4.35 p.m., expirations slow, and prolonged inspirations spasmodic; horse restless; pulse irregular . . .		68
4.40 p.m., respiration still irregular.		
4.50 p.m., horse restless, distressed, and slight loss of volition.		

	Temp.	Pulse.
5 p.m., respiration short, quick, and panting.		
5.10 p.m., horse very restless; pupil slightly dilated . . .		84
Considerable loss of dilation; breathing shallow, rapid, and spasmodic; passed fæces four times since 3.10; sweating freely.		
5.15 p.m., lying down, attempted to rise but unable	5	
Could only sit on hind quarters and make ineffectual attempts to rise.		
5.25 p.m., intense spasm of all external muscles, great distress; pulse small; suddenly fell down, muscles all relaxed; became quiet; breathing more natural, but pulse still small . . .		68
5.45 p.m., still down; restless and sweating; breathing quick; ropy mucus in mouth		50
6 p.m., pulse feeble; pupils normal .		32
6.35 p.m., respiration slightly spasmodic; paralysis of nasal muscles still present .		47
At 12.15 p.m., one drachm of bichromate of potash was given to a gelding .	100$\frac{1}{5}$	36
1 p.m.	100$\frac{3}{5}$	36
2 p.m.	101$\frac{3}{5}$	36
3.15 p.m. . . .	102	36
4.45 p.m.	102	36
5.40 p.m.	104	60
9 p.m. . . . respiration 44	106	60

The conjunctivæ were injected, the throat inflamed, with increased secretion and congestion; refused food and constantly urinating.

At 12.45 p.m., gave one drachm and a half bichromate of potash . . .	101$\frac{1}{5}$	36
8 a.m.	104$\frac{1}{5}$	40
12.20 a.m.	104$\frac{2}{5}$	40
1.15 p.m. . . respiration 20	104$\frac{3}{5}$	40

Much coughing, throat inflamed, conjunctivæ injected, discharge of yellow mucus from nostrils.

At 5 p.m., gave a horse subcutaneously $\frac{1}{2}$ grain atropine.

5.12 p.m., pupils dilating; tongue dry.

5.20 p.m., pupils fully dilated; pulse soft.

	Temp.	Pulse.
6 p.m., great restlessness; muscular twitching. Next day, pulse soft, compressible; fæces soft and coated with mucus; pupils contracted.		
At 3 p.m., gave two grains atropine subcutaneously to a horse . . .		36
3.10 p.m., pupils dilating; tongue dry; horse gaping.		
3.15 p.m., pupils dilated; iris not visible but as a mere ring; pulse 72, but soft; tongue and buccal membranes dry; animal quiet; these symptoms remained till 5.30		72
5.30 p.m., slightly restless; pulse fuller and not so quick; pupils still dilated and tongue dry; occasional spasm of diaphragm		46

Next day, 11 a.m., tongue moist; pupils still dilated; otherwise quite recovered.

I would call your attention to the experiments with morphia on the dog and horse; for although in the dog sleep is the prominent effect, while in the horse restlessness, excitement, and delirium, yet in both cases the specific action of the drug is on the brain and vascular system.

Another point worthy of notice is rise of temperature caused by the morphia in experiment (*d*), and I have found as a rule that every drug introduced in a physiological dose into the healthy system tends to raise the temperature; this subject, however, has been fully entered into, in the work already mentioned.

In the experiment with datura, the symptoms indicate that it acts like belladonna upon the sympathetic system, and hence on the mucous membrane, and it is in derangements of the mucous membranes, especially the bronchial, that we find this drug useful.

The experiment with aconitine shows the importance of this drug both on the sensory nerves and sympathetic system, hence upon the vascular system, &c., and its value in subduing inflammation is undeniable, and I must say that in my daily practice. I find this drug of great use in the many inflammatory affections animals are subject to, and its value is becoming fully recognised in the medical world.

In reference to bichromate of potash I have to thank my friend Mr. Moore, M.R.C.V.S., for first calling my attention to

its therapeutic value. I have made several experiments to ascertain its physiological action, and find it influences chiefly the granular and lymphatic system, and mucous membranes to a certain extent. In various derangements of the above parts I find this drug invaluable, and I have obtained great success with it in the treatment of farcy.

All my experiments with atropine tend to show that its influence is upon the sympathetic, the mucous membranes, and the unstriped muscular fibres of the body, and I constantly use this drug in treatment of deranged function of these parts.

I have here only attempted to indicate what practical benefit may be derived from careful experiment. And I trust the day is not far distant when we ourselves as well as our animals will be treated when ill on some scientific principle, and not by empiric remedies dictated by the fashion of the day.

FRED. JAS. MAVOR,
President.

THE MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE twenty-sixth meeting of this Society was held at the Midland Hotel, Derby, on Tuesday, November 25th, the President, Mr. F. Blakeway, of Stourbridge, in the chair. There were also present, Messrs. Greaves, Manchester; Carless, Stafford; Pyatt, Nottingham; Poyser, Ashbourne; Flower, Derby; Price, Birmingham; Markham, Rugeley; Bailey, Leicester; Rossell, Sandiacre; and the Secretary.

Letters of apology for non-attendance were read from Mr. Geo. Morgan, Liverpool; A. B. Proctor, Coventry; and many others.

Mr. Blakeway alluded to the absence of members at the Birmingham meeting in June last, and to the circular which he issued thereon. He regretted that the members did not take a more active part in these meetings for mutual advancement, as the papers read on different subjects and the discussions on the best treatment of various diseases were not only beneficial to all, but in the highest degree conducive to the best interests of the profession. He was surprised to find that the meetings were generally best attended by those who lived at the greatest distance, while they were neglected by those who lived near. He knew that members could not always attend; but thought they ought to make an effort to do so, and give the association all the support which it deserves.

Messrs. Carless, Greaves, Price, Poyser, and others, took part in the discussions which followed. It was finally resolved to hold two meetings in each year instead of three as at present.

Mr. Stanley, jun., of Birmingham, and Mr. F. Earl, of Shiffnal, were unanimously elected members of the Society.

It was arranged that the next meeting shall take place at Leicester in May.

Several papers were promised for the meeting.

THE SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

The Quarterly Meeting was held in Cumming's Hotel, Lothian Road, Edinburgh, on Wednesday, 26th November, at 2 o'clock, Professor Williams, President, in the chair.

Present—Professor Walley; Messrs. Baird, Waugh, Balfour, Black, Young, Cumming, Finlay, and the Secretary.

Messrs. Ashbee and Moore were also present as visitors.

As office bearers for the ensuing year, the President, Treasurer, and Secretary, were re-elected, and Professor Walley and Messrs. Waugh and Baird appointed vice-presidents. Mr. Baird read the following paper relating to "Diseases affecting the Respiratory Organs:"—

Mr. President and Gentlemen,—It was with very great diffidence that I agreed to bring forward a paper for discussion. I believe every practitioner is more expert in one department of his profession than another, so I can assure you that writing and reading papers is not my forte; but I will endeavour to lay before you a few cases and scattered thoughts which have occurred to me in my practice.

During the spring of this year I had to attend a number of horses suffering from disease in the air-passages.

Most of them had been recently imported from England and Ireland. Being travelled about and exposed to extreme changes of temperature, they ultimately became chilled, and unless carefully attended to, congestion of the lungs and all its fatal consequences followed.

In the months of May and June the disease became more prevalent amongst cart horses that were at regular work, but assumed a milder type. The first symptom observed by those in charge was a refusal of food. In the early stage when I was called in, I found the pulse varying from about 60 to 80 beats per minute; the legs and ears alternately cold and warm; the mouth

very hot; and heaving of the flanks. In some cases the nostrils were distended, and a yellow discharge came from them. In many animals where there was no discharge from the nose, I found a rash in the mouth, the membrane round the incisors being abraded. In my practice I never observed this to such an extent.

In a few days there was great debility. If the animal was made to walk he staggered, the legs swelled, especially at the knee and hock joints; similar swellings also took place under the chest and abdomen. In one case abscesses formed in many parts of the body.

I had thirteen cases at Leith, all within a short distance of each other, the wind at that time being invariably in the east, and very cold. The worst cases took about nine days to run their course, the most favorable about four. Necessarily, my treatment depended on the state of the patient. When shivering and blowing, I give a good stimulant, and a warm clyster, and applied mustard to the sides. The external irritation increases the powers of the flagging heart, counteracts capillary congestion, raises the surface heat, brings about reaction, and generally relieves the animal in a short time. If the patient be feverish, the pulse 60, and mouth hot, I give a small dose of aloes and repeated doses of tincture of aconite. In all other cases I may state that I find opium and calomel, nitrate of potash, tincture of opium, sweet spirits of nitre, acetate of ammonia, carbonate of ammonia, and ginger, to be valuable medicines when given at the proper time.

The saline treatment which is recommended by some I have been trying of late, and find that small doses of Epsom salts, chlorate of potash, and acetate of ammonia, are useful in such cases. They abate fever, lower exalted temperature, improve the appetite, and cleanse the mouth. In cases where the vital powers are febrile, and the legs cold, mustard applied lightly to the limbs warms them wonderfully, and appears to counteract internal congestion, and probably proves to the patient almost as much comfort as we derive when suffering from a feverish cold by placing our feet up to the knees in hot water.

In the beginning of July, sore throats and strangles became very prevalent, chiefly among horses recently brought to town. Among other cases I had two in one stable; both had difficulty in breathing, making a great noise at every inhalation. A discharge came from the nose, and saliva from the mouth.

In one of these cases, both submaxillary glands suppurated, and numerous abscesses formed in the cheeks and lips. In the other, the parotid glands were affected, the swelling was great, and the hardness intense. The throat had been blistered twice, fomented and poulticed for a fortnight, till the animal was on the point of

suffocation. I then performed tracheotomy, and immediately the tube was introduced the animal got instant relief. An abscess formed and suppurated about eight days after. As there was still a good deal of thickening of the glands, I applied some iodide of mercury ointment, after which the swelling gradually subsided. I then removed the tube and the animal has done well.

I find the best food in these cases is thin well-boiled oatmeal gruel or sloppy bran mashes with treacle. If the bowels are torpid, I simply use the clyster paper. In all these cases it is essential to have the horse at once placed in a light and airy box. I like light as well as air; you not only have an opportunity of observing your patient better, but in different establishments where I have both light and dark boxes, I find my patients do best in the light ones, but which, of course, in summer weather must be shaded from the direct rays of the sun. Although strangles generally is not a fatal disease, it entails a great loss to dealers in horses, from the time it takes to run its course, and the great risk of a valuable horse becoming a roarer. If that is once confirmed it is beyond our repair.

During my practice in Fife, I found the greatest cause of death amongst farm horses to be inflammation of the bowels. In Edinburgh, I found the greatest mortality amongst valuable horses to be caused by pleuro-pneumonia. The cause of these differences in the country horses must be the feeding; in the town horses, the extreme changes of temperature to which they are exposed.

I would suggest now that we have statistics of the contagious disease in cattle, that it would be interesting and important if all the members of veterinary societies would regularly record the diseases prevalent amongst all animals. The actual numbers need not necessarily be given, they might invidiously indicate the amount of practice of each member. What in the first instance, at any rate, is wanted, is simply the relative prevalence of particular diseases monthly in our different districts. Such information duly collected and arranged would not only be of statistical and scientific value to veterinarians, but also of great practical advantage to owners of stock. It would indicate the existence of local and general causes of disease. It would mark in different seasons and localities the special tendency to particular modes of dying, and thus the practitioner might be better armed for his combat with disease and death. Such statistics would also satisfactorily chronicle the alterations which from time to time occur in the character and mortality of diseases, alterations depending upon changes of climate, drainage, modes of transit, and general management of stock. Since my first acquaintance with veterinary practice (now nearly thirty

years ago), I can note various changes in the prevalence and character of disease which would, however, have been more satisfactorily and decidedly set forth had we possessed throughout that period reliable facts and figures to which to refer.

The troublesome and almost ubiquitous mouth and foot disease had not thirty years ago gained its present wide-spread footing in this country.

Until 1843 and 1844 we saw little of the contagious pleuro-pneumonia amongst cattle.

In rural districts quarter evil and red water were greatly more prevalent than now amongst cattle. Amongst horses, alike in town and country, colic, inflammation of the bowels, and "weed" were more frequent and fatal than at present.

This salutary change, doubtless, depends upon the greater knowledge, prudence, regularity, and better system now brought to bear on the feeding of horses, and on the discountenance of the old-fashioned plan of suppering up the farm-horses with an enormous bulk of indifferently cooked food. Suffering and loss amongst horses might in many localities be still further reduced by greater attention to feeding and watering, by regulating the change from hard to soft food, or *vice versâ*, by mixing, as is the rule in some of our large establishments in town, some cut hay with bruised oats and beans, or by allowing bran occasionally, when hay or straw constitutes the chief fare.

Railways, like many other institutions, have not been an unmixed good to our patients. They cannot be charged (as they have been in man) with inducing brain or eye diseases. They certainly save the lower animals many harassing and toilsome trudges; but they also sow broad-cast (as indicated in the opening of this paper), colds, coughs, and other diseases of the air-passages, and unless properly managed by carefully attending to the cleaning of trucks and loading banks, they will still be the means of keeping up and disseminating a considerable amount of contagious disease.

Whether from railways, climatic influences, or altered management, it is hard to say, but a marked change has certainly, during the last twenty-five years, come over the type of those diseases of the respiratory organs which I have above sketched.

Gradually, as it has seemed to me, they have become less sthenic in their character, the inflammation and fever have been less acute. A soft exudate or abundant effusion is earlier poured out, reducing treatment has been increasingly injurious. We seldom see acute cases with firm, full pulse, and painful laboured breathing, which some years past called for bleeding, calomel, and opium, tartar emetic, and other depletive remedies,

Such treatment applied to the present epizootic catarrhal dis-

orders of horses, is certain murder. With a considerable variety of town and country cases I am often struck with the difference which occurs in their capacity for withstanding disease and physic; Horses in the country especially, if in fair condition, still take their complaints somewhat in the old-fashioned more acute form, they do not so often trouble us with typhoid symptoms and typhoid complications, they will even stand occasionally the abstraction of a quart of blood, five or six drachms of aloes will not fatally purge as it will the town patient. The early nutrient and stimulant regimen so essential in town practice is not so absolutely necessary amongst these more robust and naturally matured country patients.

With one other speciality which occurs to me respecting the disorders of the present time, I must conclude these somewhat desultory remarks.

Parasite diseases appear considerably on the increase, although, I believe, more so in England than Scotland; but I have met with them both in calves and horses. I made a *post-mortem* examination of a black entire horse, which died a few weeks ago, and found his liver in a very soft state, and full of minute thread-like worms.

The remarks which followed the reading of the paper referred chiefly to the temperature in such cases as those described by Mr. Baird; the presence of filariæ in the air-passages, their cause, mode of formation, the time probably required to arrive at maturity, and whether they could be directly communicated from one animal to another, &c.

The usual vote of thanks was accorded to Mr. Baird for his interesting paper.

C. Cunningham,
Secretary.

EDINBURGH VETERINARY MEDICAL SOCIETY.

FRACTURE OF THE PARIETAL BONES IN A HORSE.

Being the subject of a Communication read before the Edinburgh Veterinary Medical Society, by Lancelot Thomas Barker, Veterinary Student.

Mr. President and Gentlemen,—On the 17th of August, 1872, I was called in to see a bay mining horse at Belmont mines, the property of the Weardale Iron and Coal Company, Limited, which had been found standing in a very peculiar position by one of the horsekeepers on going to feed and harness him for his usual day's work.

On my arrival there I found the horse standing with his head thrust against the wall, and leaning with his breast upon a triangular corn-bin which occupied one of the corners of the loose box. His pulse was 73, and breathing stertorous. On making inquiries about him I found that he had come out of the mines the day previous, having a cut and bruise upon his forehead which did not appear deep or serious to the horsekeeper, who washed and dressed it with a little mild digestive ointment, during which process he remarked that the horse seemed very quiet and sleepy, hanging his head as if it gave him pleasure to have it dressed, after which he was stabled up for the night. On going into the stable next morning, the horsekeeper was surprised to find the horse standing with his forefeet up in the manger, and his head pressed firmly against the hay-rack, quite motionless, and breathing stertorously. He called to the horse to come down, and struck him with a stick. The horse, however, took no notice; so he went for the other horsekeeper, who sent for the farm bailiff, and finding that neither words nor blows had any impression upon the horse, they at once proceeded to pack some straw against the wall behind him, in case he should fall backwards and injure his skull. The farm bailiff then placed his back behind the horse's forelegs, underneath the ensiform cartilage and posterior part of the sternum, and gave a good lift, which threw the horse off his equilibrium and caused him to swerve round in his stall, from which they moved him into an adjoining fold-yard, and ultimately succeeded in getting him into a loose box. Here he wandered round and round, always turning to the left side, but at every corner he ran his head forcibly against the wall, making blood spirt on both sides from his forehead. Occasionally he would stop in the centre and commence elevating his fore parts and then his hind ones, imitating exactly the movements of a rocking-horse, but never attempted to hit any one, although he would have walked over any person who stood in his way.

On examining him I found his eyes amaurotic, with the pupils dilated, and a considerable degree of stiffness, both in the cervical muscles and those of mastication, from which I had a dread of tetanus setting in. In considering the case carefully over I thought it expedient not to excite the animal by attempting to administer anything in the form of liquid, so I quietly, though with a little difficulty, administered a ball consisting of Aloes Barb. ʒvii and Antim. Potassio Tart. ʒj, and Zingib. Pulv.; I managed also to check his circular promenade, which was always to the left side, and cause him to place his head over a half door, which we had previously secured, to prevent him forcing open and getting out. Having got him into this position, I commenced to explore the

wound with a probe, and, finding the bone indented, I made a longitudinal incision from above, downwards, directly over the seat of fracture, and reflected the skin back on each side of the fracture, which was close upon the longitudinal parietal suture, and extended to the left side. A portion of bone about the size of a penny piece, apparently, had been driven in by a blunt instrument, probably one of the jack-nails which project from the pillars in the mines to hang lamps, &c., upon. The indented bone was fast at one side by the pericranium, so I introduced a small lever underneath it at the lower end, and the broad blunt end of a probe underneath it superiorly, and elevated it carefully to the level, at the same time removing the small sharp detached fragments from the wound with a pair of forceps. Both the external and internal layers of compact tissue were fractured, and pressing upon a portion of the falx cerebri and convolutions of the left hemisphere of the cerebrum. After relieving the pressure by elevating the bone, I brought the edges of the skin into apposition, and applied a little teased-out lint loosely; then a double fold of cloth over it to protect the exposed bone from atmospheric air. Orders were given to the men to remove the cloth at night and foment the part with a cloth dipped in hot water and strained out, and then dress as before; also to sponge his face, and offer him to drink a little tepid water, but he, being unconscious, would not take any notice of either food or drink. I told them to be as silent in their movements as possible when approaching or doing anything to him, and let me know if any worse symptoms appeared.

I saw the horse again on the 18th instant; he was still unconscious, but did not bore his head so much against the wall, but rested with his mouth pressing into the bottom of the manger, from which I removed all loose hay, &c., to enable him to breathe freely. Pulse 85, and feeble in character, which I attributed to the action of the medicine. Breathing rather sonorous, but not so stertorous as on the previous day. Eyes amaurotic, but I thought the pupil of the left eye was not so much dilated as on the 17th inst. The bowels had not responded to the physic, nor had he taken either food or water. I ordered him to be fomented and dressed as before, with as little noise as possible.

I again saw him upon the 19th inst. and found him purging freely; he had ceased to wander around the box, but appeared dull and languid, hanging his head rather low. Pulse 60 and soft. On passing my hand before the left eye he winked, showing that vision was returning, but the right eye was still amaurotic with dilated pupil. He had taken a swallow or two of water in the morning; the wound appeared healthy, with a

very slight somewhat sanious discharge. Ordered treatment as before.

On the 20th I found a marked improvement; pulse 48; the horse was eating a little bran mash and hay, had also micturated freely; gave Nit. Potass. ʒiv and Colchicum Pulv. ʒj in a little bran mash and linseed, which he ate. Healthy granulations were present in the wound; the fractured bone was still remaining in the position in which I placed it, and showed no sign of exfoliation. I ordered that cold water with a little common salt in it be bathed upon the part occasionally, and digestive ointment to be applied. There was slight vision appearing in the right eye, which improved daily afterwards; told the men to give him easily digestible food for a few days.

I saw him again three or four days after; the wound was new filled with healthy granulation, and the edges of skin were approaching each other. Ordered that he be kept from work but have gentle walking exercise every day, which was done for about three weeks, when he was sent to his usual work, which he has continued to perform ever since without showing any untoward symptom.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

Monthly Council: *Wednesday, December* 10. — Present: Earl Cathcart, Vice-President, in the chair.

Veterinary Committee.—Mr. W. Wells, M.P., reported that the committee recommended that the grant of £150 to the Royal Veterinary College be paid for the current year in two instalments, as usual. During the year the Committee had met twice, and made two reports to the Council.

They had received from Professor Simonds two reports, one on the parasitic lung disease of lambs, and the other on the health of the animals of the farm, in addition to a previous report on the latter subject already published in the last number of the *Journal*.—This report was adopted.

The following is a summary of Professor Simond's report on

Parasitic Lung Disease of Lambs.

A list of questions was issued last year to members of the Lincolnshire Agricultural Society, with a view of ascertaining under what conditions this disease is most prevalent, and various experiments have been had recourse to for the purpose of throwing

further light on the development of the worm or worms which are the cause of the malady. These experiments cannot be said to have been very successful. It is, however, now satisfactorily ascertained that more than one variety of thread-worm finds its way into the air-passages of the lungs of sheep. Of the "long-strongle" of Dr. Cobbold (Gordius of Dr. Crisp) even less is known, with reference to its natural history and development, than of the Strongylus filaria, or common lung-worm. Both species are believed to undergo important developmental stages out of the body of the sheep during this time in the soil, or in the plants of ordinary pasturage, or in artificially cultivated clovers and grasses.

On farms on which the disease exists the greatest care ought to be exercised to keep lambs from pastures, and from clover and other layers which had been fed with sheep at an earlier part of the year. Experience has shown that lambs dropped on turnips and allowed to run before the ewes, and later on fed on tares and similar green food, and on cabbages specially cultivated to come in about weaning time, are comparatively free from attacks of the lung-worm. It has also been observed that the disease is kept active when the system of renewing the flock of ewes from lambs bred and reared on the farm is adopted.

In Lincolnshire during the summer the ewes are fed on permanent pasture and new seeds, after harvest on the stubbles and clover and other eddishes until they are broken up for wheat, when they go on turnips, following the hoggets; in many instances the tups are put to the ewes while they are feeding on new seeds. Ewes and lambs are soon removed from turnips to the new seeds and pastures, where they remain until weaning time, when the lambs are put on the pastures "until they become settled," when they are removed to the clover eddishes, or to the clovers grazed previously with the ewes and lambs, or occasionally to white clovers grazed two years in succession. The young animals are thus, during the most dangerous period of their lives, kept on land and on food the most likely to infest them with the parasites, which having, in the form of ova or embryonic worms, been coughed up by infected sheep, have undergone a further development fitting them for dwelling within the respiratory organs, the habitat in which they become sexually mature, and give rise to organic diseases of the lungs by their enormous multiplications. It also appears that the lambs, which are diseased to a serious extent, are changed about from pasture to pasture, both natural and artificial, and thus distribute broadcast myriads of ova and immature worms over the whole farm, to become in due time the cause of disease in the lambs which are yet unborn.

ROYAL COLLEGE OF VETERINARY SURGEONS COLLEGE FUND.

(*For the Obtainment of more Suitable Premises.*)

COMMITTEE.—Professor Brown, President; Messrs. Balls, J. C. Broad, James Cowie, William Field, jun., T. W. Gowing, M. J. Harpley, T. W. Mayer.

TREASURER.—Mr. S. H. Withers.

SECRETARY.—Mr. W. H. Coates.

The following List of Subscribers to the Fund for Building or purchasing suitable premises for the offices of the College is complete to the present date, December 26th, 1873.

	£	*s.*	*d.*
Donation originally given by T. W. Mayer, Esq., in 1849	37	14	0
Interest thereon	27	2	6
Adlard, J. E., Esq., London	1	1	0
Axe, J. W., Assist.-Professor, R.V.C., London	2	2	0
Balls, Messrs. G. and Son, Brixton	21	0	0
Barker, William, Esq., Middlesborough	2	0	0
Broad, James C., Esq., London	10	0	0
Brown, G. T., Professor, R.V.C., London	20	0	0
Brown, John, Esq., London	2	2	0
Burrell, Messrs. T. and Son, London	10	10	0
Carless, Messrs. J. and Son, Stafford	2	0	0
Cartledge, B., Esq., Sheffield	21	0	0
Cartwright and Hill, Messrs., Wolverhampton	50	0	0
Cave, George, Esq., Liverpool	5	5	0
Child, James, Esq., Hackney	5	0	0
Coates, W. H., London	5	0	0
Collins, Jas., Esq., Staff V.S., Dublin	5	5	0
Constant, S. P., Esq., 5th Dragoon Guards, Dundalk	5	5	0
Cooper, William, Esq., Berkhampstead	5	5	0
Cope, Alexander C., Esq., London	5	5	0
Dray, E. C., Esq., Wansworth	5	0	0
Field, William, Esq., jun., London	100	0	0
Fleming, G., Esq., Royal Engineers, Chatham	5	5	0
Gowing, Messrs. T. W., and Son, London	10	0	0
Greaves, Thomas, Esq., Manchester	20	0	0
Hammond, John, Esq., Bale, Norfolk	1	1	0
Harpley, M. J., Esq., Royal Horse Guards	5	5	0

	£	s.	d.
Harpley, M. J., Esq., *Anonymous*	5	5	0
Hunt and Parker, Messrs., Birmingham	50	0	0
Kent, W. H., Esq., London	5	5	0
Kennedy, Thomas, Esq,, Wrexham	1	0	0
Lawson, Alexander, Esq., Manchester	5	5	0
Lepper, Messrs. H. and G. A. Son, Aylesbury	10	10	0
Longman, George, Esq., Cavalry Depôt, Canterbury	2	2	0
Lowe, Clement, Esq., London	2	2	0
Malcolm, John, Esq., Enniscorthy	2	2	0
Mavor, William, Esq., St. Leonard's-on-Sea	10	0	0
Mavor, Messrs. Alexander and F. J., London	50	0	0
Moon, James, Esq., Kingston-on-Thames	5	0	0
Moore, James, Esq., London	5	0	0
Moss, Michael, Esq., Sittingbourne, Kent	1	1	0
Naylor, M. E., Esq., Wakefield	10	0	0
Olver, Thomas, Esq., Truro	1	1	0
Overed, J. D., Esq., Blofield, Norfolk	2	2	0
Owles, Alfred J., Esq., Staff V.S., Aldershot	1	1	0
Pearce, J. H., Esq., Whitchurch, Hants	1	0	0
Ritchie, James, Esq., Gateside, Kincaldrum	5	0	0
Roots, William, Esq., London	2	2	0
Simonds, J. B., Professor, Principal R.V.C., London (£10 *for each hundred subscribed*)	30	0	0
Smith, William, Esq., Norwich	5	0	0
Taylor, James, Esq., Colchester	3	3	0
Wallis, W. S., Esq., Halstead	2	2	0
Wells, Thomas, Esq., Beacondale, Norwich	1	1	0
Withers, S. H., Esq., London	5	0	0
Withers, Henry, Esq., London	1	0	0
Withers, Alfred, Esq., London	1	0	0
Woodger, Joseph, Esq., London	10	10	0
Woodger, Joseph, Esq., jun.	10	0	0

A gentleman has offered to give £100 towards the fund on condition that nine other members of the profession will subscribe not less than £100 each. Or the same gentleman will give £50, provided that nineteen others will subscribe a sum of not less than £50 each for the same purpose.

NEW MEMBERS OF THE PROFESSION.

At the several meetings of the Court of Examiners of the Royal College of Veterinary Surgeons, held at 10, Red Lion Square, during the week commencing December 15th, the following students from the Royal Veterinary College were admitted members of the Body Corporate:

Mr. Walter Boulton Spooner,	London.
,, Reginald Percival Lord,	London.
,, George Barrow,	Newmarket.
,, Richard Porter,	Alfreston, Sussex.
,, Charles Edwin Ogden,	Brooklands, Manchester.
,, William Rolfe Shirley,	Twickenham.
,, Franklin Farrance,	Hastings.
,, Francis Edward Knott,	Landport, Portsmouth.
,, Alfred George Leaney,	Tisbury, Wilts.
,, John Thomas King,	Botley, Southampton.
,, Harry Bird,	Bolton-le-Moors, Lancashire.
,, Samuel Durham,	Donnybrook, Dublin.
,, Thomas James Robert Endle,	Plymouth, Devon.
,, Samuel Worsley,	Pendlebury, Lancashire.
,, Richard Frederick Shillingford,	London.
,, Neville Bruce,	Islington.
,, Adolphe Harrison Thomas,	London.
,, Henry Hicks,	Metheringham, Lincolnshire.
,, John Stephens,	Tregony, Cornwall.
,, James Standen,	London.
,, William Ratcliff Bryan,	Loughborough, Leicester.
,, John Dibben,	Derby.

The following students, also of the Royal Veterinary College, passed their *first* examination:

Mr. Arthur Bostock,	Mossley, Manchester.
,, Walter Longhurst,	Farnham.
,, Luke Drummond Moutray,	Dublin.
,, William Thomas Clark,	London.
,, William Thomas Gooseman,	Grimsby.
,, Richard Ferris,	Capton Littisham.
,, Thomas Henry Merrick,	Northampton.
,, Charles Concanver,	Tuam.

Veterinary Jurisprudence.

ALLEGED CASE OF PLEURO-PNEUMONIA.

Ramsden *v.* Briggs.

In this case Mr. Atkinson, barrister (instructed by Mr. Leeming) appeared for the plaintiff, a farmer of Southowram, and Mr. Storey for defendant, a cattle dealer of Wike. The case was tried before a jury. Mr. Atkinson said the action was to recover £24 5s. 8d. for a cow sold to plaintiff on the 24th of May by defendant, and which the latter warranted sound, but which was not so, the defendant knowing that it was not sound. On the day mentioned the parties met in the Halifax Cattle Market, where plaintiff bought the cow for £22. Defendant told him he had bought the cow in Lincolnshire, and warranted it sound. Plaintiff paid the money, and took the cow home. The sum claimed was the difference between what plaintiff had given for the cow and what it was sold for, with other charges. As plaintiff's man was driving it along he noticed that it was short of breath. After a time the cow became worse, and on the following Sunday, Captain Ormsby, superintendent of the West Riding police, accompanied by Mr. Walker, veterinary surgeon, Halifax, visited the cow, and found it suffering from pleuro-pneumonia. The cow had to be separated from the others on the farm, and to be visited every three hours day and night, plaintiff having to change his clothes every time for fear of carrying the infection to the other cows. The veterinary surgeon attended the cow for six weeks, and his and other charges, including loss of time and loss of milk for six weeks, were included in the sum claimed. Defendant, according to the declaration, had not only committed a breach of warranty, but had fraudulently represented the cow to be sound, when he knew at the time it was not so. The cow was cured and sold for £11 in the Halifax Cattle Market, the defendant being present at the sale, and at the time he said, "Take that rotten thing away from the rest," thereby showing that he knew something of the disease from which the animal was suffering.

Robert Ramsden, the plaintiff, stated that the defendant warranted the cow to him as good, honest, and sound, adding that it had calved the day before. Afterwards, however, it would not eat, and did not milk right. He sold the cow by auction for £11, and there was a loss of 1s. 8d. for two gallons per day for six weeks. In cross examination plaintiff said that when the cow was sold by auction it was stated that it had had a disease, but it was then better. Mr. Nettleton bought the cow, and he (plaintiff) agreed to give him fifteen guineas for it last Saturday at the Brown Cow, Halifax. It was "a drunken bargain," and he had

not yet paid the money for it, and he did not know whether he should pay it or not. The cow was in a good state in one sense but not in another. It would not bear pushing.—In re-examination plaintiff said he would not give £22 for the cow, and the mistal had never been complained of.

Captain Ormsby, inspector under the Cattle Diseases Act, deposed visiting plaintiff's farm, and finding the cow in a state of disease already referred to. He had no cause of complaint with the mistal or fold-yard. He believed the disease had been one of ten or fourteen days' standing.—In cross-examination witness said he could not positively state how many kinds there were of pleuro-pneumonia. He could tell a contagious case of pleuro-pneumonia when he saw it. In this instance he believed it to be a contagious case.

Parman Walker, veterinary surgeon, Blackwall, Halifax, gave evidence corroborative of the diseased state of the cow from pleuro-pneumonia. In his opinion the cow had been suffering ten days from the disease. In this case the disease was of the contagious character, and the milk would fall off. He attended the cow for twenty-nine days, and his charge was £2 13s. 6d., which the plaintiff paid him. In cross-examination, witness said he knew the cow was bought by Nettleton, and he had never been to see her since. The person who had the cow eight days before the first sale could not have told that anything was the matter with her. It was possible for a cow to have the disease with scarcely any symptoms of it. It was quite probable that a diseased cow, in company with others, might infect them. He had not heard that the cows associated with this one had escaped infection.

Adam Walker, brother to last witness, stated that he had been in practice with him a short time, and had been altogether fifteen months in practioe. The cow in question was suffering from pleuro-pneumonia, and the symptoms might have been present a week or ten days or a fortnight before. The cow was in an advanced stage of disease when he saw it. In cross-examination, witness stated that before he became a veterinary surgeon he was a blacksmith. He had passed the College of Veterinary Surgeons. He and the last witness had not compared notes. In re-examination, witness said he had known in a case like this of recovery from pleuro-pneumonia.

Albert Ramsden, quarryman, son of plaintiff, said he remembered the cow coming to his father's premises, and he took the cow to market for sale after it had recovered. Defendant was there with some cattle, and, when this cow went amongst them, defendant told them to take that rotten thing away. Witness then took it away.

Henry Dewhirst, in the employ of plaintiff, said he remembered the cow being bought by his master, last May, in the Halifax Cattle Market, but did not hear the bargain. He drove the cow home, and noticed she was not well by her standing, and

also by the way in which she moved. She breathed badly, and grew worse in this respect. The cow was two hours in going two miles. On milking her at first she gave nearly two quarts, but a cow in health would ordinarily give twelve quarts a day. She grew worse in the supply of milk. In cross-examination, he said the cow was not taken from the other cows until the inspector came. The inspector came on the Sunday, the day after the cow arrived. Plaintiff saw him on the following Monday, and he (witness) told him what was the matter with the cow. Briggs's name was not then mentioned. The cow would not eat anything when it arrived home.—This was the case for the plaintiff.

For the defence, Mr. Storey drew attention to the way in which the defendant had been sued, adding that such a thing as warranty had never been mentioned to his attorney. A letter was written, to which reference was made at the opening, but in which not a word was said about a breach of warranty. The case was entered in the court on the 27th September, and the particulars then given were:—"This action is brought to recover £24 5s. 8d., amount of loss sustained by the plaintiff, by reason of defendant having sold the plaintiff a certain cow afflicted with contagious disease." Not a word in those particulars about a warranty. It was only when the action was brought that the subject of warranty was mentioned. The defendant never gave warranty in his life; it was contrary to his custom to do so; defendant was not asked for one, and did not give one. As for the statement that defendant knew the cow was unsound, and represented it as sound, thereby inducing plaintiff to purchase it for £12, the fact was, even according to the evidence of the veterinary surgeons, it was not proved that the cow was unsound, and they had not been to see it since they were paid for their services. The cow, in fact, was suffering only from an ordinary cold, and it had been only four days before it was sold to plaintiff.

Simon Briggs, farmer and cattle dealer, of Wike, was then called, and stated that on the 24th last May he sold a cow to plaintiff for £22. He had bought it on the Tuesday before at Leeds, from William Wilson, and he sold it to plaintiff in the Halifax Cattle Market on the following Saturday. He did not tell plaintiff that he bought the cow in Lincolnshire, and he never had bought a cow in that county, either by himself or agent. He told defendant he bought her at Leeds. He never warranted the cow to plaintiff, and had never warranted a cow in the Halifax Cattle Market. She had calved the day before he sold her, and to his knowledge she ailed nothing before he sold her. He saw her put up to auction, and did not say to any one, "Take that rotten thing away." Until a fortnight ago, in this court, he never heard about a warranty with the cow. In cross-examination, witness said he did not know that purchasers asked if a cow was sound and good, but they asked if they were good milkers. In other respects they used their own judgment. He asked £22

10s. for the cow, but took £22. In cross-examination, he said he did not know that he had praised the cow, but he might have said she was a good one. She was a good one. He did not say she was sound nor all right; he did not say she was either right or wrong. Nothing was said about the cow at the Corporation Arms before the money was paid. The cow walked from Leeds, and there was nothing the matter with her before he sold her that he knew of. It took three hours and a half to bring her from Leeds to Wike, a distance of ten miles. In re-examination, witness said he never, directly or indirectly, said a word in warranty of the cow.

Abraham Greenwood, buyer of cattle for the Halifax Industrial Society, deposed to being in the cattle market on the 24th May, when he saw defendant there, and that he recommended the cow to plaintiff as sound and healthy as far as he could judge. She stood well, and he never heard her make a noise. She was not bad in breathing, and she walked well. Re-examined: The cow was "cudding" three times that day, and cudding was generally a sign of health.

Edward Wilson, of Harehills Lane, Leeds, from whom defendant bought the cow, stated that when he sold it on Tuesday in the cattle market at Leeds, it was healthy, and nothing the matter with it. He sold it for £22 10s., and it was with calf at that time. In cross-examination he said he did not warrant the cow, and was not asked for a warrant.

Joseph Shepherd Carter, Bradford, member of the Veterinary College, stated that if a cow was in an advanced stage of contagious pleuro-pneumonia, it was not possible for it to become perfectly healthy afterwards. He saw the cow on the 15th inst., and also that morning, and it had not been suffering from contagious pleuro-pneumonia during the last twelve months. In cross-examination, he said it was possible to cure a cow of such a disease, so as to be useful. He would not swear that the cow never had contagious pleuro-pneumonia.

Robert Pearson, a member of the College, Halifax, said he had that day examined the cow, and in his opinion it had not had contagious pleuro-pneumonia. He was appointed by the Halifax Corporation as inspector of the cattle market.

Mr. Storey having summed up for the defendant, Mr. Atkinson spoke at length in behalf of the plaintiff, observing that the plaintiff and defendant were in direct opposition to each other in respect to the warranty. It was therefore for the jury to consider the probabilities of the case, look at all the surroundings, and draw their own inferences as to which was correct. He contended that the probabilties were in favour of the plaintiff.

His Honour then summed up, and said that if any one represented a thing to be good when there was no means of ascertaining the fact, thereby inducing another to purchase it, a warranty was not necessary to be proved. The warranty was perfect in

itself, as in the case of a cheese, a watch, a horse, or of wine. It did not matter whether the dealer knew what he said was true or false. Fraud in law existed in the case of a man who made a statement, not caring whether it was true or false. That was legal fraud. Moral fraud existed in the case of a person who stated that which he knew to be false.

The *jury* retired to consult, and on their return into court, gave a verdict for the defendant.—*Halifax Courier.*

FALMOUTH COUNTY COURT.

A CASE OF SPAVIN.

At the Falmouth County Court, before Mr. Bere, judge, and a jury, a case which created some interest and continued for several hours was recently heard. The plaintiffs were Messrs. John Freeman, William George Freeman, and John Dean Freeman, the well-known granite merchants at Falmouth, for whom Mr. G. A. Jenkin, of Penryn, appeared; and the defendant was Mr. John N. Gould, who resides between Falmouth and Redruth, for whom Mr. Henry Rogers, of Helston, appeared.

The claim was brought for £50, in consequence of the defendant selling a horse to the plaintiffs for £73 10s. warranted sound, whereas the horse was not sound, and was re-sold by the plaintiffs at an auction at a loss of £50. A second count alleged that the defendant well knew, at the time of sale, that the horse was unsound.

The evidence for the plaintiff was, that defendant said he had a horse for sale for seventy guineas, and that Messrs. Freeman sent men to see it, the result of their trials being that they considered it safe and good in every respect. Subsequently Mr. W. G. Freeman asked defendant some questions with reference to the soundness of the horse, and he replied that it was perfectly sound, had as good legs as any horse in the kingdom, and had been examined by a veterinary, and pronounced sound. The animal was purchased, and soon after it was noticed that it went down on the near hind leg. When Mr. Freeman went to London he gave orders that the leg should be bandaged, and that the animal should have rest; but, on his return, finding that it still gave way on this leg, plaintiff asked defendant to take it back and return the money; and this being declined, the animal was sold by auction for £22 10s.

Mr. Olver, member of the Royal College of Veterinary Surgeons, deposed that in January last the defendant brought him the horse at Truro for examination, it being about to be purchased by Mr. Reed, of Truro. He found that it had bone spavin, and told the defendant that it was unsound. He replied that he knew there was an enlargement there, but that it had never been lame;

that he had never applied anything to it, but thought of doing so. He also said that Mr. Jackman, of Plymouth, would have bought the horse had it not been for that. The last witness did not pass the horse as sound. If the animal had bone spavin in January it would be likely to have it in May. Bone spavin was a bony enlargement situated on the inner or anterior part of the hock, which was likely to produce lameness when the animal was put to fast work. The horse could not have been sound on the 27th of May. He saw the horse again on the 2nd of September, at the request of the plaintiff. It was then very lame, and the bone spavin was still there. The animal once having had that disease was, he considered, unsound for ever.

Mr. Rogers, for the defence, contended that there was no warranty. He called Wm. Dunstan, farrier, who examined the horse before it was purchased, and considered it had not bone spavin then.

George Vincent, of Truro, *Thomas Sewell*, coachman to Mr. Beauchamp Tucker, and the *defendant*, gave evidence opposed to that adduced for plaintiffs for the whole amount claimed.

Mr. Rogers intimated his intention to apply for a new trial.

Mr. Jenkins remarked that it would be ill grace to do so after the case had been heard by Mr. Rogers' own jury.

RESIGNATION OF DR. MURIE, PROFESSOR OF ANATOMY AT THE EDINBURGH VETERINARY COLLEGE.

The *Scotsman*, Dec. 5th, says that at a private meeting of the trustees of the late Professor Dick, held in the Council Chambers yesterday, a letter was read from Professor Murie, Professor of Anatomy in the Edinburgh Veterinary College, resigning his office. The trustees accepted the resignation and resolved to take steps for filling up the vacancy. We understand that the course followed by Professor Murie is due, partly to ill health, partly to certain circumstances connected with the internal management of the College.

ACCIDENT TO A VETERINARY STUDENT IN THE HUNTING FIELD.

We regret to learn that Mr. Alfred Hoole, son of Charles Hoole, Esq., of Hallam Gate, sustained an accident when out with Earl Fitzwilliam's hounds, on Dec. 22nd. The meet was at Wickersley Bar. The hounds were running in the neighbourhood

of Morthen. The accident happened in taking a leap, when Mr. Hoole fell, owing, we believe, to the swerving of his horse. Mr. Hoole's leg was broken near the ankle, it is supposed by the horse stepping upon it. Dr. Walker, of Rotherham, who was out with the hounds, gave his assistance, and Mr. Hoole was taken to Morthen Hall. Mr. Hoole is a pupil of Mr. Cartledge, veterinary surgeon, and is now a student at the Royal Veterinary College, London. He was down for his holidays.—*Sheffield Independent.*

MISCELLANEA.

NAMES FOR HORSES.

Mr. St. H— had a capital stud groom who came with him from England. The first foal born in the colony of Wellington was from a mare of Mr. St. H—'s. Some officers and friends were admiring the pretty little creature, and one of the ladies asked the groom what his name would be? "Harribogene," answered the groom pat enough. "What? I never heard such a word before!" "Didn't you now, Miss! Well, it's a wonder, too; it's what they call them Maories as is born in the place!" Then we knew that the groom meant Aborigine, but "Harribogene" was the name of the horse to his dying day. Another year a great pet, an Arab mare, had a filly, a plump round little beauty; not so leggy as foals usually are. Miss St. H— asked her brother to name the new filly "Hebe," and accordingly he told Harry the groom the next time they were talking together. "Hebe, sir? It's a filly!" "Yes, I know it's a filly. 'Hebe,' you'll remember the name, Harry?" "I ain't likely to forget that," was his reply. A year afterwards Camilla dropped a colt foal, and Mr. St. H— said to Harry at the stables, "What shall we call the colt?" "Call him, sir? Why call him 'Shebe;' I can't see nought else for a name. You went and let Miss there call the filly last year 'He-be,' though it was a filly, and you must just call the colt 'She-be,' and that'll make 'em both about right, I reckon." So Shebe was the name of the colt, and is now.—*The Church of England Magazine.*

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Communications and Cases.

OBSERVATIONS ON RARE PARASITES FROM THE HORSE.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

When Mr. Varnell published his admirable comments on "*cases of parasitic disease*" in the April number of the *Veterinarian* for 1864, he expressly stated that his chief object was "to add to the common, but, as yet, scanty stock of this description of veterinary literature." Since the time when this passage was penned by Mr. Varnell, we have made great strides in the science of helminthology; nevertheless the truth of the latter part of the remark still holds good to a great extent. Indeed, as regards the parasites of the horse, it may be said that the subject has been most unfairly neglected by the profession. It is true that considerable additions have been made to our stock of knowledge respecting the parasitic affections of other domesticated animals; and, perhaps, on the whole, the profession can hardly be blamed for the deficiencies just referred to, considering the little encouragement formerly given to scientific researches of this description. It may be said, indeed, that there has been positive discouragement, and, therefore, the wonder is that any veterinary practitioners took the trouble to move in the matter. But for the efforts of Professors Simonds, Dick, Varnell, Brown, Gamgee, and a few other well-known members of the profession, it may be said that even the scanty information we now possess would to this day have re-

mained in abeyance. As already hinted, little or nothing has been done as regards equine parasitism, and this is the more remarkable considering the importance of hippopathology in relation to veterinary practice.

In the previous number of the *Veterinarian,* Mr. Axe has a contribution respecting a new addition to the parasitic fauna of the horse; but he should not have hesitated to acknowledge that the recognition of the true nature of the parasites in question was due to the determination of one of his colleagues. When it was first submitted to me for identification I informed Mr. Axe that the creature was the larva of a dipterous insect, called Helophilus. Any one reading Mr. Axe's paper, however, would be led to suppose that he had himself discovered the true character of this entozoon. In this connection, as confirming the truth of my determination that the larvæ of Helophilus may become parasitic; I may mention that at least one instance of its occurrence as a human entozoon has been brought under my notice.

I wish, also, particularly to say that, although I originally recognised the larvæ of *Helophilus* as equine parasites, I do not think they can be at all common. When Mr. Axe speaks of "large numbers of long, white, slender bodies found projecting from the anus," he probably refers to *Oxyurides*, which I strongly suspect he has mistaken for the larvæ of *Helophilus!*

If I introduce these remarks on a matter of *etiquette,* I do so in order that I may the more effectively tender my best thanks to those gentlemen who have forwarded specimens of worms as donations, either to the College or to myself. In the same spirit Mr. Varnell always recognised the help of his various contributors; and the editor of the *Veterinarian* has, I believe, scrupulously followed the same rule.

As science advances only by very slow degrees, there is, I am sure, no need to apologise for the necessarily incomplete and fragmentary character of communications such as the present must be. I fear, indeed, that many excellent members of the profession do not possess the faintest notion of the labour necessary to work out exhaustively the general natural history and special developmental relations of any one of the meanest parasites which may happen to attack the horse. In spite of the difficulties of rapid advance, a thousand experiences have shown that nothing is to be gained by sitting aloof with folded hands, as if totally unconcerned in the elucidation of such questions. The following *data* will, I think, demonstrate the appositeness of these remarks.

On the 14th of March, 1873, I received a letter from

Professor Williams, in which he says:—"I send you a small portion of the colon of an Iceland pony which died here the other day. There were no parasites in the intestinal canal, but, as you will find by the specimen, several in the intestinal walls." Professor Williams further requested my examination and identification of the parasites; at the same time, drawing my attention more especially to the circumstance that the worms were of two readily distinguishable sizes.

I have no copy of my reply to Mr. Williams (who was then acting as Principal of the College founded by Professor Dick), but on referring to his letter I find I have appended a brief note in pencil, to the effect that I thought the worms might ultimately turn out to be juvenile stages of growth of *Onchocerca reticulata*. I also expressed the opinion that a paper, by Professor Dick, referred to the same parasite. I have since satisfied myself that these worms represent a totally distinct species of nematode parasite. In this place I may likewise mention, incidentally, that on the following day I received another batch of interesting parasites from Professor Thomas Walley. To these I hope to refer at greater length on another occasion.

A painstaking search throughout the literature of parasitism has led me to the belief that the late Professor Dick was the first person who possessed any acquaintance with the entozoa under consideration; and I have the more pleasure in pointing out this fact, since I am indebted to the successor of that eminent veterinarian for the present examples. I also retain agreeable personal recollections of the original discoverer. It is true that the scientific value and importance of this discovery may not turn out to be of any great moment; nevertheless, the mere record of the facts will not only testify to the keen powers of observation evinced by the former Principal of the Edinburgh Veterinary School, but also to the fact that the existing veterinary authorities co-operated in the cause of scientific progress along with the anatomical teachers of the extra-academical medical school.

The communication to which I may now refer as undoubtedly embodying a description of the same species of worms as those sent to me by Professor Williams is contained in the 'Edinburgh Medical and Surgical Journal' for 1836, vol. xlvi, p. 92, *et seq.* It is from the pen of the celebrated Dr. Knox, and is entitled "Remarks on the lately discovered entozoa infesting the muscles of the human body; with some observations on a similar animal found beneath the intestinal membrane of the horse."

The first part of the paper is taken up with a notice of the

facts connected with the discovery of *Trichina spiralis ;* the second and shorter division being devoted to the consideration of the equine parasites. "On two occasions," says Dr. Knox, "my friend Mr. Dick found parts of the large intestines of a horse presenting the following appearance: the gut being simply laid open so as to exhibit the mucous membrane, a number of dark spots are observed, evidently exterior to the inner membrane." And, further on, speaking of the worms, he adds ; "they have no cysts, and vary from the tenth of an inch to a length of at least seven-tenths. They have a digestive tube divided into numerous compartments or sacculated ; a mouth unarmed."

Professor Dick's own statements, as communicated by Dr. Knox, are particularly interresting. He says, "I have found these worms in several horses, and at different stages of their growth, from the size of a pin-point to that of an inch and a half in length, and in two instances in the blood-vessels.

"They seem almost always to produce a bad form of diarrhœa, and seem to depend on the food or situation in which the animal has been previously kept. The horses I have found affected with these have always been running out previous to their becoming ill."

The question which here naturally presents itself to one's mind is as to whether these worms are or are not different stages of growth of the palisade worm (*Strongylus armatus*). I have come to the conclusion that they are not young palisade worms, chiefly from the circumstance that I have seen no denticles at the oral aperture, whilst the position of the reproductive outlet appears to differ very materially. Further observations may disprove the correctness of my views, especially if larger specimens than those I have seen be examined.

Dr. Knox's communication is accompanied by an excellent plate, in the lower part of which there are five figures relating to the worm in question. Two of the parasites are given of the natural size ; there being also enlarged views of the same. The fifth figure shows a magnified view of the head ; all of the illustrations seem to be perfectly accurate. At the time I made the illustrations accompanying this paper I had not seen Dr. Knox's admirable representations. The worms figured by Dr. Knox might very well be made to do duty for the smaller of the two differently sized parasites transmitted by Professor Williams.

Viewing these entozoa as representing a species of nematode for which, hitherto, no proper generic and specific

title has been given, I propose to recognise the worm provisionally under the combined name of *Trichonema arcuata*. This distinctive nomenclature will have the advantage, not only of calling more attention to the peculiarities of the worm, but also of separating it from a variety of other nematodes of the horse with which there is at present no evidence to show that it is in any way genetically associated. I entertain no doubt whatever that the "extremely small" worms mentioned by Mr. Littler in a letter to Professor Varnell, are referable to these self-same parasites; and, therefore, if my determinations are correct, the following references and description will afford a fair estimate of the state of our knowledge of this entozoon up to the present time :—

TRICHONEMA ARCUATA.

Dick.—"Worms at different stages of growth;" in MS. to Dr. Knox, 1836.

Knox.—"Animals similar to *Trichina*;" in *Edin. Med. and Surg. Journ.* (*loc. cit.*).

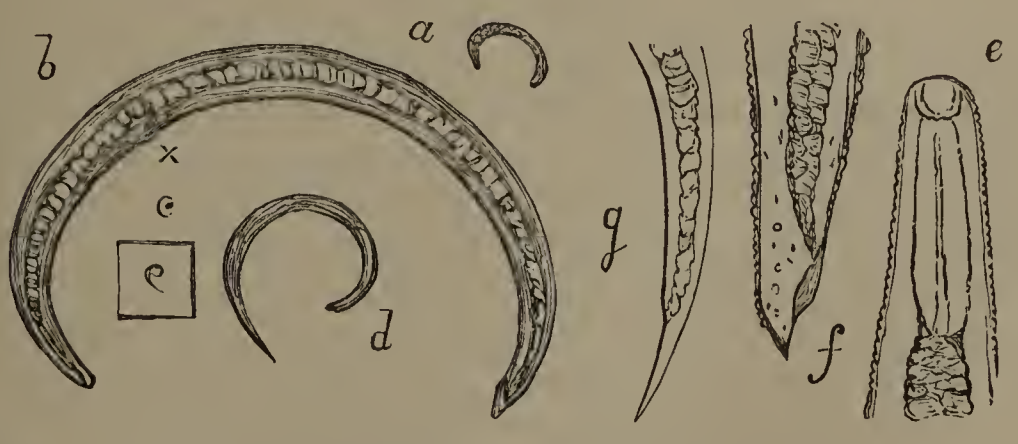
Diesing.—"Nematoideum equi caballi;" *Syst. Helm.*, vol. ii, 1851.

Littler.—"Extremely small ascarides;" in a letter to Mr. Varnell; *The Veterinarian*, 1864, p. 202.

Varnell.—"Entozoa in various stages of growth;" *The Veterinarian, ut supra*, p. 265.

Williams.—"Entozoa from the intestinal walls;" in MS. to the author, March 13, 1873.

Cobbold.—*Trichonema arcuata*, a new species of nematode (with description as below).



Description of Figure.—*a*, sexually immature female of the natural size *b*, the same enlarged, showing the form of the head and tail, also the uniformly sacculated character of the intestinal tract, and more particularly the position of the reproductive papilla (marked ×); *c*, sexually immature male, of the natural size, within the intestinal membrane; *d*, the same enlarged; *e*, head of the female magnified; *f* and *g*, tails of the male and female enlarged.

Body spindle shaped, more narrowed posteriorly than in front; head truncate, with circular mouth, cup-shaped buccal cavity, and muscular œsophagus; tail of the male drawn out to a long fine point, that of the female being abruptly pointed; reproductive papilla of the female situated at the lower part of the upper third of the body.

Size: Males, $\frac{1}{10}$ to $\frac{1}{8}$ of an inch in length, by $\frac{1}{130}$ to $\frac{1}{120}$ in breadth; the females averaging $\frac{4}{10}$ of an inch in length by $\frac{1}{40}$ in breadth.

According to Professor Dick, some of these worms attain the length of an inch and a half. As Mr. Dick spoke of the presence of these worms in the blood-vessels, I think it most probable that the larger forms referred to by him were only examples of the palisade worm, which, as I have explained, appear to be quite distinct from the minute forms described and figured in Dr. Knox's paper.

I believe that the references above given pretty well exhaust the literature of the subject; but, although the records presumably referring to this entozoon are so scanty, I have not thus far unearthed them without much labour. Doubtless, it is possible that other more obscure notices of the worm may have been placed on record, but only those who have specially laboured in this intricate department of science are likely to stumble upon them. Many of the published notices of worms occurring in our domesticated animals are so incomplete, that it is perfectly impossible for even the practised helminthologist to pronounce as to what species the writers severally refer to. Thus, to give a truly obscure example, a German author, Peschel by name, had, prior to Diesing, spoken of a worm which he found attached to the walls of the saphena vein in the horse. Peschel appears to have employed the same name for his worm as Diesing employed for Dick's worm; but to which species of entozoon Peschel refers it is impossible to say, since he neither furnishes particulars as to size nor other characters of the animal. As the record stands I incline to the opinion that Peschel's *Nematoideum equi caballi* was an example of the reticulated threadworm to which I have before adverted.

In reference to Mr. Varnell's description of Mr. Littler's specimens, I may add that, from the contents of his paper, published in April, 1864, I had some difficulty in making out the particular species to which he referred. The doubt, however, entirely disappeared when also I read his supplementary observations, given in the succeeding number of the same journal. Certain appearances which he had described in his first paper as "blood spots" he afterwards

found to be dark points, "containing young worms in various stages of growth." But for Mr. Varnell's candour in correcting what he then termed "an important oversight," I should not have been enabled to identify the parasites as coming under the same category as those I have now more fully described.

In conclusion, whatever light future investigations may throw upon the actual origin and development of *Trichonema arcuata*, I am persuaded that this imperfect contribution will not be without its value in enabling future observers to render the record of the natural history of the parasites of the horse more complete.

Since the foregoing remarks were penned, and in answer to a letter of mine, Professor Williams has been so good as to supply me with some further particulars. Writing from Edinburgh on the 10th of January, he says:—"I forget exactly what I said to you about the Iceland pony, but I may now state that there were no very marked signs of the presence of parasites during life. The appetite was good. There was no cough, and we were led to suppose that there were worms by the absence of disease more than anything else. There was gradual emaciation, but no diarrhœa, and at no time were the fæces fetid. Professor Dick, I think, says diarrhœa is a prominent symptom. In this case it was absent. I may mention that the mesenteric glands were greatly enlarged, many of them containing pus, and what appeared to be the débris of the parasites. I fed some fowls with the flesh of the pony. Two of them died with their livers full of parasitic ova." Mr. Williams likewise adds, in a postscript, that "the fæces of the pony were repeatedly examined, but no worms were discovered."

I am very much obliged to Principal Williams for these additional particulars. The absence of other nematode worms, either in the fæces or in the intestinal canal itself, when taken along with the other facts I have advanced, tends to prove that the worms in question are totally independent forms, having no genetic relations with either the palisade worms, on the one hand, or the Oxyurides and Onchocercæ on the other. My impression is that the nematodes seen by Professor Dick in the blood-vessels were the ordinary palisade strongles, having no developmental relation to the smaller parasites which he obtained from the same animal.

BLOOD-POISONING EXPERIMENTS.

(*Continued from* p. 6.)

We record two other experiments in further illustration of this subject, which were had recourse to for the purpose of determining the length of time the diseased blood would retain its malignant properties.

December 30th.—A guinea-pig was inoculated, *one puncture*, with the blood of the rabbit (No. 3) which died November 27th, twenty-eight hours after inoculation. The blood, which had been obtained on November 27th, had been kept during the interval in a phial the mouth of which was closed with cotton wool. It was examined previously to being used, and no Bacteria were detected.

No constitutional effects were produced, but the site of the inoculation became inflamed in the course of a few days, and ultimately a small slough separated from the part.

January 2nd, 1874.—Some of the same blood was used for inoculating a second guinea-pig. In this case *two punctures* were made, as had been the practice in the greater number of the former experiments, but no effects, excepting local, were produced.

The local effects corresponded in their progress with those observed in the guinea-pig inoculated December 30th, and terminated in the same manner.

We now wait the opportunity of making further investigations by receiving a fresh supply of blood from an animal dying of blood disease.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from p.* 16.)

The Berberal Alliance, which must now occupy our attention, brings together plants of most opposite looking characters, but, when duly considered, it is one as natural as most others. Lindley says: "The combination in the same alliance of Epimedium and Vines, or of Fumitories and Berberries, may at first appear paradoxical. But the sequence of affinities shows that this association is truly natural. The Berberal alliance is connected with the Ranal by means of Fumeworts, which are so nearly related to Poppyworts that

some botanists refuse to separate them as independent orders. The affinity of Fumitories and Epimedium with plants generally associated with Fumeworts under the name of Nandineæ is obvious; to the latter all botanists ally the true Berberids. The passage from Berberids proper to vines is by no means difficult to perceive, and thence Vines may be regarded as passing into Pittosporads by means of the climbing fleshy-fruited Billardieras in the latter order.

But, however the affinities may be made out, there can be no doubt that the Berberial alliance, as made out by Professor Lindley, contains some most interesting plants, and we shall, therefore, illustrate some of these by referring to individuals in the four following natural Orders, though they are not all belonging to the alliance.

Orders of Berberals.

1. Droseraceæ.—Sundews. *Flowers regular and symmetrical.*

2. Fumariaceæ.—Fumitories. *Flowers irregular and unsymmetrical.*

3. Berberidaceæ.—Barberries. *Flowers regular, symmetrical, stamens opposite the petals, placentæ sutural.*

4. Vitaceæ.—Vineworts, Vines. *Flowers regular, symmetrical, stamens opposite the petals, placentæ axile.*

Three other Orders distinguished by a different arrangement of the parts of the flowers, stamens, and ovules.

1. Droseraceæ, *Sundews.*—These are represented by our native sundews and the Venus' Fly-trap, which is often met with in our plant-stoves.

The English Botany describes three distinct species, as follow:—

Drosera rotundifolia.—Round-leaved sundew, red rot.
„ *anglica.*—Larger long-leaved sundew.
„ *intermedia.*—Lesser long-leaved, intermediate sundew.

These present minute differences in their leaves and flowers, but practically we may consider them all under one head. They are all remarkable for their delicately-constructed leaves, armed on their upper surfaces with stiff erect hairs, each of which is tipped with a red gland, while the margins are fringed with longer hairs, which are likewise glandular. These latter exude a viscid matter, in which small insects become entangled, and it is said that the leaves slightly collapse when touched, in which respect they approach the action of the Dionæa.

Mrs. Lankester observes that "The contractile nature of the leaves of the Drosera is confirmed by a number of observers;" and Dr. Withering, in his 'Botany,' gives the details of numerous experiments on the subject. Probably the sensitive condition of the plant is not so observable in our British species as in those of warmer climates, but certain it is that numbers of dead insects are constantly found sticking to the leaves, and that on warm, sunny days, on touching the surface with a pin, or any other object, the leaves may be seen to contract, and the little red bristles to close round in a very remarkable manner. Belonging as the Drosera does to a very irritable family of plants, numbering among them the celebrated Venus' flytrap (*Dionœa muscipula*), we can scarcely be unprepared for this peculiar characteristic in our British species.

The sundews are inhabitants of the mossy swamp; indeed, they may be emphatically called "bog plants." Occasionally a little boggy morass is lit up with the sundew, always an attractive object to the botanist.

"By the lone fountain's secret bed,
Where human footsteps rarely tread,
'Mid the wild moor or silent glen,
The sundew blooms unseen by men."

In such scenes its upturned leaves are very attractive, and it is curious to observe that this very property has got it the name of sundew (*Herba solis*), and at the same time obtained for it a reputation for the cure of melancholy, probably because it was supposed that it could shed sunlight into the heart.

These plants possess some stimulating qualities, and hence were used as medicine, but in as far as cattle are concerned it possesses an evil report which will be presently referred to. Gerarde says, "The leaves being stamped with salt, do exulcerate and raise blisters to what part of the body soever they be applied."

"The later physicians have thoughte this herbe to be a rare and singular remedy for all those that be in a consumption of the lungs, and especially the distilled water thereof; for as the herb doth keep and hold fast the moisture and dew, and so fast that the extreme drying heat of the sun cannot consume and waste away the same; so, likewise, men thought that herewith the natural and radical humidity in men's bodies is preserved and cherished. But the use thereof doth otherwise teach, and reason sheweth the contrary; for seeing it is an extreme biting herbe, and that the distilled water is not altogether without this biting quality, it cannot

be taken with safety; for it hath also been observed that they have sooner perished that have used the distilled water thereof than those that have abstained from it and have followed the right and ordinary course of diet." Doubtless the plant was recommended in consumptive complaints upon the doctrine of similitudes or signatures on account of its bright appearance in sunshine, but it is true, though sad, that bright plants do not always heal or contribute to brightness of spirits.

The sundew is said to be poisonous to cattle, but as the plant is small, and usually grows in the more treacherous part of the bog, which cattle usually avoid, there is reason to believe this notion to be ill founded. Its significant name of "red rot," by which it is known in the country, perhaps more truly represents the origin of the evil report as regards cattle, the truth being that such places as would favour the growth of the sundew are just those that would have all the conditions necessary for the development of flukes. We may then look upon our native sundews as interesting little plants, which, although harmless, are just those with which all who have to do with cattle should become acquainted, as wherever they are found they are sure indications of the dangerous nature of the pasture, if, indeed, pasture it can be called.

The Venus's flytrap should be examined by those who can get access to it. In this curious plant the enlarged petiole seems to be expanded for the purpose of performing the true leaf function, while the lamina is in two folding portions, reminding one of the ordinary rat-trap; each of the two lobes is armed with three strong spines or bristles arranged in a triangle, which bristles, says Lindley, "are extremely irritable, and, when touched, cause the two sides of the leaf to collapse with such considerable force that they cannot be separated again without employing violence; they, however, spontaneously open again in a short time."

2. Fumariaceæ.—This Order is represented by several native species belonging to the two genera *Fumaria* and *Corydalis*, while the Dialytra of our gardens is perhaps one of its finest representatives.

The genus Fumaria is said to derive its name from *fumus* (smoke), either because the plants are said to have a smoky smell, or on account of the light, almost smoky appearance of the herbage of some of the species, which seem to rise out of the ground almost as a smoke.*

The Corydalis is named from κορυδαλις, the Greek name

* 'English Botany,' vol. i, p. 404.

for the Fumitory, with which the present genus was, till lately, united.

They are, indeed, so nearly related that for all practical purposes we may consider them under one head.

The fumitory is a common agrarian weed, well known by its pretty pink flowers and elegantly-divided though dusky-coloured leaves. It was formerly in high repute for cases of spleen, whatever they might be, but it is as a cosmetic that it seems to have been widely employed, and this, probably, from its pink flowers on the one hand, and its dusky leaves on the other. These, on the doctrine of signatures, might be supposed to point at once to the brightness it might be supposed to be capable of imparting, as well as to the duskiness it might remove. Clare speaks of the plant thus:—

> "And *fumitory*, too, a name
> Which superstition holds to fame,
> Whose red and purple mottled flowers
> Are cropped by maids in weeding hours
> To boil in water, milk, and whey
> For washes on a holiday
> To make their beauty fair and sleek,
> And scare the tan from summer's cheek;
> And oft the dame will feel inclined,
> As childhood's memory comes to mind,
> To turn her hook away and spare
> The blooms it loved to gather there."

In reference to this Mrs. Lankester says—

"Since that time other, and perhaps more injurious applications have taken the place of this herb in the mysteries of the toilet, for we can scarcely believe that the words of old John Ray the naturalist would be better received now by the votaries of fashion than they were in his own day, when he said, 'No better cosmetics than a strict temperance and purity, modesty and humility, a gracious temper and calmness of spirit; no true beauty without the signatures of these graces in the very countenance.'"

Strange as were these former appliances of this plant, we have yet a more curious part of its history to unfold. On our farm we have each year a large dule of doves as summer visitors. Now, it happened that some years since these beautiful birds, the turtle doves (*Colomba turtur, Colomba turturelle Fr.*), as they do year by year, paid particular attention to our field of peas, when several of them were shot, as our neighbours say, *pour encourager les autres*, the expectation being that their crops and gizzards would be full of peas, but strange to say that neither then nor in many cases since examined have we found peas to be the food of these birds,

but in all instances they were so full of the seeds of one or other of the commoner Fumitories, that in one instance we counted as many as *eight hundred seeds in the crop of a single bird that was supposed to have been shot in the very act of pea stealing.*

It seems, then, that with us the fumitory seeds are the natural food of these birds, and for these they migrate to us as soon as these seeds begin to ripen. Health and prosperity, then, to the turtle dove, and may our friends in future make amends for the false charges for which too many of his family have suffered.

THREE CASES OF LEAD-POISONING IN HORSES.

By H. P. Greene, M.R.C.V.S., St. John's, N.B., Canada.

On September 13th I was called upon to examine a horse *post-mortem*, which had died under peculiar circumstances on the morning of the above date. The following is a brief history of the case. On Thursday, the 11th of September, at noon, the horse was noticed to be particularly lively; he was turned out to grass, and taken in that night; nothing was noticed to be the matter with him, and he ate and drank as usual.

On Friday morning he was observed by the groom to be unwell; the owner having been made acquainted with the fact, sent for a non-qualified practitioner to attend him. He diagnosed the case as one of overfeeding, and ordered him a dose of linseed oil. In trying to administer it he found the animal could not swallow. Repeated trials of administration were had recourse to, but with the same result. The horse was said to be in great pain, voided neither fæces nor urine, frothed at the mouth, the tongue hung out, and was of a bluish-black colour. On replacing it in the mouth it would hang out again, and was without feeling. There were also twitching of the muscles, also tympany, as well as hurried and laboured breathing, and cold extremities. All these symptoms lasted till 4 a.m. on Saturday, when death put an end to his sufferings.

Autopsy.—On opening the abdomen the peritoneal coat of the intestines presented a light pinkish colour. There were patches, extravasation of blood in various parts of the mesentry, some even the size of a shilling. The intestines being

removed from the abdominal cavity, their contents, which were in a semi-fluid state, consisted of masticated hay, oats, and grass, as well as a quantity of water. Both large and small intestines were in a spasmodic condition, and inflamed in patches. There was also extravasation of blood in spots of about the size of a half-crown piece, in several parts of both large and small intestines, and existed principally between mucous and muscular coats. The mucous coat was easily peeled off. The external or peritoneal surface of the stomach appeared free from any lesions, and on opening it it was found to contain only masticated hay, oats, and grass. At the junction of the cuticular and villous portions it was highly inflamed and thickened, and had a resemblance to half-boiled tripe. This condition existed principally at the fundus of the stomach; its mucous coat easily came off. The liver was slightly enlarged, and its structure easily broken down; spleen engorged with blood; kidneys apparently healthy; bladder empty.

On opening the thoracic cavity the lungs were found congested to a considerable extent, and the bronchial tubes contained a blood-coloured fluid.

The pericardium contained eight ounces of a reddish coloured fluid, but there was no clot. The external surface of the heart was healthy, and there were *petechial* spots on the septum ventriculum, but they were confined chiefly to the left side; a few also could be seen on the outer wall of the left ventricle. From the above appearances, but principally from those presented by the stomach and intestines, I was of opinion that the horse had died from the effects of some irritant poison. I then inquired into the previous history of the case, which was as follows: The owner had no suspicion of any person poisoning the horse; the animal had been fed on sound hay and oats, but the water came through a leaden pipe two hundred feet in length, from a pond, to a wooden tank in the stable, in which was erected a wooden pump, and the water pumped up as required for the use of the horses only. The mystery was at once revealed. I then tasted the water, but failed to detect anything by this test. From the paralysis of the muscles of the pharynx and tongue, as well as those of the intestines (indicated by the horse having lost the power of deglutition, and the torpidity of his bowels, together with the fact of soft water coming through a leaden pipe), I was strongly of the opinion that it was lead which had done the mischief. The water was discontinued being given to the remaining two horses in the stable till it would be subjected to chemical tests.

On arriving home I took a test-tubeful of the water and added to it a little dilute sulphuric acid, and a white precipitate was thrown down. Another portion of the water was taken, and to it was added some hydrosulphuric acid; a dark brown precipitate was immediately thrown down, both tests indicating the presence of a soluble salt of lead in the water.

On allowing the precipitate of lead sulphate to settle and stand for a few hours, the water turned a purple colour. This doubtless was due to the action of the excess of sulphuric acid on the organic matter in the water.

On examining the water with the aid of the microscope, vegetable matter could be easily detected. No crystalline form was observed. This horse had been drinking of the water for over *three years*, and during that time he was not known to show any signs of sickness, except an attack of influenza in October, 1872.

I should have stated that this pipe has been down and in daily use for over fifteen years, and the owner has never lost but one horse in that time from disease, and that from paralysis. He considers it was due to the drinking of this water.

On Wednesday, the 10th of September, the pond was cleansed, and the pipe, by means of a powerful syringe, was blown from the pond end of the pipe, and all its contents deposited in the tank, which was *not* cleaned out, but allowed to settle, and the water given as usual to the horses.

The fact of the matter which lined the inside of the pipe having been blown into the tank, and the lead being exposed to the action of soft water and atmospheric air, and the horses drinking of such water, is sufficient evidence to prove, without chemically testing for lead in the water, that it was lead which acted as the poisonous agent. It can be also shown that these horses had been taking lead for a length of time, in small doses doubtless. In order to fully authenticate this, I may state that they would not drink any other water; and it is well known in lead mining districts that animals will even break through fences in order to get at water in which lead had been washed, though even thick and muddy, while they will reject good water not so impregnated.

The owner was cautioned against the use of the water, and advised to watch the remaining two horses.

Case 2.—On the following day, Sunday, the 14th, another of the horses was noticed to be ill. I was sent for, and arrived at the place about noon.

The following symptoms presented themselves: the horse looked dull and dispirited. Pulse weak and wavering and 70 per minute, breathing increased, cold extremities,

staring coat, hide-bound, urine and fæces were voided last, early in the morning, mucous membranes slightly injested. Bluish-black spots or marks on the tongue and other parts of the buccal membrane. There was imperfect mastication, and the power of deglutition was partially arrested; in fact I may say completely, for in administering even lukewarm water the horse would hold it in his mouth and make several attempts to swallow without getting any down. It was then tried to make him drink water; he would thrust his head into the pail and seemed anxious to drink, but could not. Not having a probang with me at the time, I was resolved to try the effect of a brisk stimulant to the throat; I selected for that purpose, mustard. This had the desired effect. He could not swallow immediately after its application, and not till the lapse of three quarters of an hour, and only then with difficulty. Mag. Sulph. Zinci ℥viij was administered in continuation with Ferri Sulph. ʒij and Tr. Gentianæ ℥j in linseed gruel. Orders were left to have Mag. Sulph ℥j given every six hours, and plenty of linseed gruel till the bowels responded. Occasional doses of Ext. Belladon. were given to allay pain.

The third animal, a black mare, was examined now. She showed no signs of being poisoned, though she had been drinking the lead water; she was ordered Mag. Sulph. by way of preventing untoward results should the poison have effect.

On the following morning I again visited the patient and found him in a similar condition, except his having passed a few hard knobs of excrement coated with inspissated mucus; no urine was voided. Treatment was continued, and enemas of soap and water were freely thrown up the rectum.

15th, 6 p.m.—Breathing increased; anxious-looking countenance; pulse 80, and scarcely perceptible, twitching of the muscles of thighs and arms, coldness of extremities. In such a debilitated state it was thought necessary to administer a stimulant and support the patient as much as possible. Ol. Tereb ℥j, et Tr. Gentianæ ℥iss was given in gruel for two doses. Ac. Sulph. ʒj in gruel was given afterwards instead of Mag. Sulph. Extra clothing was also put on.

16th, 9 a.m.—Breathing greatly increased. Pulse 100, and almost imperceptible; in fact, they could only be taken with any accuracy from the heart; mucous membranes of a dirty yellowish hue, buccal membrane getting darker. The animal looked as though he would drop every moment.

Stimulants and enemas were continued. Six p.m.—Greater prostration existed than in the morning; pulse 120. The treatment was discontinued. He retained the power of swallowing up to death, and voided urine after I saw him. He died at 11 p.m. on Tuesday, 16th September, having lived over three days under the influence of the poison, while the first horse died in eighteen hours after being first noticed sick.

A *post-mortem* examination was instituted next morning. The lesions which existed in this case were similar to those in the black horse that died on the previous Saturday, with the exception of their being in a more advanced stage, especially the lungs and large intestines. This horse having lived longer than the first one, which died under the influence of the poison, is sufficient to account for the increased morbid appearances.

Case 3.—The black mare that showed no signs of being affected on Sunday was noticed to be rather dull during the afternoon of Monday, and at 6 p.m., when the second case was visited for the second time that day, the black mare could only swallow with difficulty and masticate very imperfectly; her coat stared though her body was quite warm; pulse weak and quick, 55 in number, fæces hard and glazed, although Mag. Sulph. in large quantities had been given. Aloe Bbd. ʒiij was now administered, and plenty of linseed gruel allowed to drink. On the following morning the bowels were slightly relaxed, and continued so all day. Mag. Sulph. in large quantities, with carminatives, was still being given, yet purgation was not set up. The pulse continued to get weaker and more frequent. The breathing increased to twenty-two respirations in a minute; urine voided as usual. When taken out for a little exercise she could move with tolerable ease at first, but would *very qaickly* get tired. The visible mucous membranes were injected, and the buccal membrane presented bluish spots; they disappeared on the 17th September. Mag. Sulph. was continued in conjunction with Ferri Sulph. et Gentianæ till the 24th, when all the symptoms abated, except her not having the same freeness of action which she had prior to the attack on the 15th September. She continued in this state up to October 18th, when it was thought prudent to give a few doses of strychnia, and before the sixth dose was given a decided improvement was manifest. She continued to improve rapidly and was perfectly well in a week after.

HOW TO KILL THE MITES, TICKS, AND LICE AFFECTING THE LOWER ANIMALS.

By A. E. Macgillivray, V.S., Banff.

How to get rid effectually and safely of the external parasites (Ectozoa) found on the lower animals is often a question of considerable importance to the owner of any description of stock. Of late this subject has several times been commented upon in the pages of the *Veterinarian*, with some diversity of opinion; and as I have myself made many experiments with the destructive agents generally used in such cases, I intend here to give a few of the results.

In the *Veterinarian* for January, 1873, will be found a quotation from the *Medical News*, stating that a decoction, tincture, or ointment of the seeds of staves-acre (*Delphinium staphisagriæ*) will effectually destroy all kinds of lice as well as their nits. In the *Veterinarian* for January, 1874, will be found the details of some experiments made by Mr. A. J. Murray, V.S., Detroit, U.S., in which he failed to destroy the common louse of the calf (*Hæmatopinus vitali*) by complete immersion in tincture of staphysagria. These two statements savour too much of the contradictory to be passed over without observation.

It is now sixteen years since I first saw Ung. Staphisag. Delph. very successfully applied in a most inveterate case of mange in a favourite greyhound. The mites (*Sarcoptes canis*) and their eggs were entirely eradicated, and a healthy skin left. The practitioner who prescribed in this case invariably used staves-acre ointment in cases of mange alike in horses, cattle, or dogs. I never saw him use it, however, in the destruction of lice or ticks.

I have used extensively, for the destruction of the mange-mite of the horse (*Sarcoptes equi*), an ointment composed of Hydrarg. Sulphurati Rub., Potass. Subcarb., Sulph. Sublim., &c., and have found some very effectual. For the greasy mite of the horse's legs (*Sarcoptes hippopodus*) I have found the application of Hydrarg. Bichlor. and glycerine very beneficial. For all sorts of lice (Pediculi) I used to prescribe invariably a mixture of one part of spirits of tar (Oleum picis) to four of linseed oil, which was certainly very *killing*, but extremely disagreeable, and necessitated a vast amount of subsequent washing with warm water and soap.

Having had the advantages of using *Staphisagria delphi-*

nium brought under my notice, I resolved to give it a trial, and from the beginning have been highly satisfied with the results. My first case was a milch cow, with very dirty skin, and literally covered with large pediculi (*Hæmatopinus eurysternus*). This poor cow had no rest, continually fidgetting night and day, and fast losing flesh. I prescribed an ointment composed of—

℞ Staphisagriæ pulv., ℥ij;
Adipis Suillæ, ℥viij.

Mix well and heat to boiling-point. This was to be well rubbed in. After ten days the owner reported, "Cow quite at ease, lice all gone, skin and hair beautifully clean and soft, and condition much improved." The pediculi in this case failed to put in appearance again, so that the staves-acre must have destroyed eggs and egg-producers alike.

Within the last three months I have had an unnsual number of cases of horses suffering from eruptions on their legs and even thighs, accompanied with much itchiness; this is *eczema impetiginodes*, or, as it is commonly called, *grease*. In general it is confined to the lower parts of the hind legs; but this season I have had several cases extending well up the legs, with almost unbearable itching. This itchy "grease" is attended by a mite (*Sarcoptes hippopodus* or *Symbiotes equi*), which I have got rid of by washing with warm water and carbolised soap, drying thoroughly, and then applying—

℞ Staphisagriæ pulv., ℥ij;
Adipis Suillæ, ℥vi;
Olei Olivæ, fl. ℥ij;
Sapid. Calaminaris pulv., ℥j.
Acid. Carbol. Glac., fl. ℥ss.

Mix and heat to boiling-point. As there is often constitutional disturbance, I have also generally administered a slight purge, and followed with tonics and diuretics.

In the last prescription it will be observed that there is an ounce of calamine. I only use this when there is much excoriation resulting from tearing with the teeth, and rubbing the one leg on the other, to relieve the intolerable itching caused by the clusters of mites.

I had one most intractable case of this eczema impetiginodes in an old cart mare. I tried Hydrarg. Bichlor. and glycerine,—no improvement; then the Hydrarg. Sulph. Rub., Potass. Subcarb., and Sulph. Sublim.—no better; finally I applied the above compound staves-acre ointment with marked benefit, and every appearance of a permanent cure.

In conclusion, I can candidly recommend the application, for the destruction of lice, mites, &c., of staves-acre, prepared either in the form of an ointment as above, or as a decoction; for not only does it destroy the parasites, whether *insecta* or *arachnida*, but it acts as a calmative to the irritated skin, and improves the appearance of both hair and skin.

Professor Williams, in his interesting and valuable work on 'Veterinary Surgery,' advises the use of staves-acre in getting rid of mites, lice, and ticks, and mentions in detail the preparation of the ointment and decoction. In fine, so well known was the lice-killing powers of the seeds of staves-acre to our forefathers that they called it the "louse-wort."

HYPERTROPHY AND ACUTE INFLAMMATION OF THE KIDNEY.

By Henry Jarvis, M.R.C.V.S., Burwash, Hawkhurst.

Case 1.—A short time since I was called in to attend a working ox, suffering, as the owner supposed, from an impaction in some part of the alimentary canal. On questioning the owner previous to treating the animal, I ascertained from him that the ox, about three weeks previous to this, had been unable to perform his usual amount of work. At that time there were relaxation of the bowels and bodily weakness; consequently he was turned into a warm yard, and allowed to rest from work for about three weeks, at the end of which time he seemed, to all outward appearances, to have regained his usual health and strength. He was then again yoked and put to work, which he performed with rather more energy than was usual for him. He was kept to his work all day, and at night, as usual, his yoke was removed, and he ate his supper as usual. On the following morning, when the man went to feed the oxen, he found this one lying down, and all his efforts to make him rise were ineffectual. The owner was called, and I was sent for. On my arrival I found the animal lying down, and it was with very great difficulty that he was made to rise.

The *symptoms* were such as are generally put on in cases of inflammation, viz. general febrile symptoms, such as injected mucous membranes, dry muzzle, mouth hot and dry,

an intermittent pulse, partial suppression of urine with great irritability of bladder shown by frequent attempts to urinate; very little fæces passed, owing, no doubt, to the great pain caused in voiding them; hind legs slightly abducted, with general stiffness of them, and very little flexion of the joints; back arched to remove pressure from the kidneys; general surface of body cold; extremities cold; when lying down rolling off the abdomen to remove pressure from the kidneys; breathing accelerated, with great moaning and other symptoms indicative of great pain. On passing the arm up the rectum great pain was produced upon pressure to the left side, and a large tumour could be felt, which on being touched caused great pain. Later in the day the ox was continually getting up and down.

Judging this to be a case of hypertrophy of the kidney associated with acute inflammation, I had recourse to the following *treatment*, not for a moment thinking to effect a cure, as, from the symptoms and general appearance of the animal, I felt certain he would not live many hours, which was true, as he died about six hours after I first saw him. I had recourse to the antiphlogistic mode of treatment, such as bleeding and the administration of saline aperients and Oleum Lini. I also gave calomel and opium to excite the other emunctories of the body, such as the liver, pancreas, &c. I also gave enemas at frequent intervals; hot sheepskins put on the loin, and the body clothed and kept warm, but no treatment was effectual.

Post-mortem appearances.—One kidney was enormously enlarged, and there was a cylindrical outgrowth from its pelvis. Altogether the mass weighed ten to twelve pounds. The cruræ of the diaphragm and the psoæ muscles of the left side, and the other structures immediately in apposition, were very much inflamed. The right kidney was quite healthy and normal. The enlarged mass was shown, on microscopical examination, to be made up almost entirely of scrofulous matter.

Case 2.—*Softening of the Structure of the Kidney.*—On March 17th, 1873, I was called up at night to attend to relieve a cow in parturition, there being breech presentation.

The calf was removed without much difficulty, but the cow never seemed to do well after, although this was not told me until being called in to attend her on the 6th of November, when she was supposed by the owner to be suffering from hemo-albuminuria. I found her very weak and greatly prostrated, loathing all food; she having been ill for

some days, but now putting on more serious symptoms, the owner was induced to send for veterinary aid. On examining the cow I found much the same symptoms as in Case 1, but not associated with so much pain. The animal voided her urine very frequently, and on examining the urinal fluid I found the colouring matter to consist of the cortical and medullary substance of the kidney; at times portions as large as a pea were passed. I felt certain that the cow could not live long in this state, which was the case, no treatment being effectual.

Post-mortem appearances.—Both kidneys rather enlarged, but very soft and flabby, the right one being much more so than the left one. The ureter of the right kidney was very much dilated, and the bladder contained about two or three ounces of urine like that which had been voided by the cow previous to death. On laying the kidneys open nearly all the parenchymatous structure flowed out, especially that of the right one.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of December, 1873, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Antwerp.	Harwich.	Sheep-Scab	...	6	...	...	6	6
Hamburg	Hull . .	,,	...	3	...	...	3	3
Total . . .		...	...	9	...	...	9	9

"Privy Council Office,
"Veterinary Department, 12th January, 1874."

"ALEXANDER WILLIAMS,
Secretary.

CATTLE PLAGUE.

The *Central Journal* of the German Empire states, that since the authentication of the last case of disease a period of more than four weeks has elapsed, and that, according to a notification of the District Government at Oppeln of the 21st of this month, the disease has been extinguished. Intelligence of two days later, viz., 23rd, however, gives an account of an outbreak in Prussian Silesia, at Wiednitz, where upwards of eighteen head of cattle had been attacked.

Cattle plague appeared during the month of November, in the kingdom of Bavaria, on three farms at Heindsclag in the district of Wolfstein; fifteen head of cattle died, and ninety were killed as diseased or suspected by the authorities.

From Vienna reports state the continued prevalence of cattle plague in Galicia, Lower Austria, Upper Austria, Styria, and Carniola. No change is reported from Hungary or Croatia and Sclavonia.

The disease also exists at Salonica and Trebizond, but has disappeared from Greece, except the Island of Naxos.

FOOT-AND-MOUTH DISEASE

Is very prevalent throughout the entire cantons of Switzerland, particularly at Berne; the disease is believed to have been introduced from the northern parts of Italy.

Lisbon.—Foot-and-mouth disease is still very prevalent in this district.

Madeira.—Foot-and-mouth disease is reported as existing in this island.

Reports from various parts of the country are to the effect that the disease is again on the increase. During the months of November and December the disease had also gradually increased in the Metropolitan Market at Islington. Several animals were seized by the inspector, and already twenty-three cases have occurred there this month.

PLEURO-PNEUMONIA DISEASE.

This disease, which was reported as existing in Switzerland, is believed to be confined to the department of Vaud.

SHEEP-POX AND SCAB.

Sheep-pox and scab continue to prevail in Pomerania in several districts of Stettin and Köslin.

Facts and Observations.

Histology of the Sudoriparous Glands.—The sudoriparous glands of the palm of the hand and of the skin of the head are stated by Professor W. Krause (*Centralblatt*, No. 52, 1873) to have a single layer of columnar epithelium lining them throughout their entire extent. In order that this may be shown clearly rather complex treatment is required. The skin should be treated successively with chromic acid, alcohol, and hæmatoxylin, and very fine sections should then be made. The hæmatoxylin solution is best prepared as follows, when it offers the further advantage of not being liable to decomposition: decoction of logwood, 30 to 60 parts; alum, 5; chromate of potash, 0·1; creasote, 0·2; filter. When good sections have been made they are subjected to the action of absolute alcohol, oil of cloves, and Canada balsam dissolved in chloroform. All the glomeruli are invested by a sheath of muscular tissue; the muscular fibres are short, thin, and separable by hydrochloric acid.

Termination of Nerves in the Lip.—Dr. Palladino (*Bull. dell' Assoc. dei Natural. di Napoli*) states that in the lips of the horse, which are very richly supplied with nerves, many isolated, non-medullated fibres run from the subcutaneous connective tissue into the deeper layers of the epithelium, where they have a straight course and terminate by free extremities after they have traversed the deepest layer of the pavement epithelium, occasionally exhibiting a terminal dilatation or enlargement. Palladino has not been able to discover any connection of the nerve-fibres with peculiar stellate cells of the rete Malpighii, as described a year or two ago by Langerhans.

New Process for the Preparation of Sulphuretted Hydrogen as a Laboratory Reagent. By W. Skey (*Chem. News*, xxvii, 161).—It is proposed to supersede the ordinary process for the preparation of sulphuretted hydrogen by the following. The generating flask is charged with fragments of galena and granulated zinc in about equal proportions, and the mixture covered with dilute hydrochloric acid (1 to 20). An energetic and regular current of sulphuretted hydrogen is evolved. The gas is accompanied by a little free hydrogen, and requires washing to remove traces of hydrochloric acid.

The apparatus may also be arranged as a simple galvanic couple, in which a piece of *massive* galena occupies the position of the negative element; the connecting wires are passed through the cork of the apparatus, and are brought into contact with each other by means of binding screws. The evolution of gas commences on making the connection, and ceases instantly when the current is interrupted. This latter arrangement, though somewhat more troublesome to prepare, is nevertheless to be preferred, inasmuch as it avoids the necessity of removing the exciting liquid when the evolution of gas is no longer required.—*Journal of the Chemical Society.*

Passage of Gasses through Colloidal Membranes of Vegetable Origin. M. A. Barthelemy.—The author repeated the experiments which Graham made with caoutchouc, with leaves of certain varieties of *Begoniaceæ*. Though it was difficult to preserve in the several experiments the same hygrometric state and conditions of external pressure and temperature, the numerical results sufficiently show that oxygen passes more quickly than nitrogen, and that air thus dialysed contains, on an average, 36 per cent. oxygen (a number slightly under that which Graham obtained with caoutchouc). In another experiment, having made CO_2 pass over the membrane, he marked the point to which mercury descended in an hour; then passing nitrogen or oxygen, he marked how long the mercury took to descend to the same level. The results closely agreed with Graham's, and warrant the conclusion that the natural colloidal surfaces of plants have for CO_2 an admissive power 13 to 15 times greater than that for nitrogen, and 6 to 7 times greater than that for oxygen. Carbonic anhydride passes less quickly than hydrated carbonic acid. The author remarks that "cuticular respiration appears sufficiently proved by the presence of colloidal membrane in all organs; by the similarity (physical and chemical) between this membrane and caoutchouc; by Graham's experiments; by measurements of the passage of gas through colloidal membrane; and lastly by M. Boussingault's experiments, which attribute to the upper surface of leaves, devoid of stomates, a decomposing power greater than that of the under face covered with these small orifices."

Iodic Acid in Hypodermic Injections.—Dr. Luton has been investigating the above substance, the properties of which appear to be very remarkable. Iodic acid is highly soluble in water; a solution to one fifth can be easily obtained, and it is that which Dr. Luton employs. In this proportion iodic acid does not produce a sore, but it causes amidst the

tissues into which it is injected a deep modification which induces rapid absorption. Dr. Luton has employed it in goitre, in indolent adenopathic swellings of the cervical and submaxillary regions, and in a case of osteo-periostitis of a phalanx of the hand. The results have been excellent. Upwards of half a drachm of the solution, as above, has been injected at once. This substitutive injection is thrown into the midst of the tumour, and Dr. Luton thus utilises the natural envelope of the ganglion or degenerated growth, and avoids a diffusion which might be attended with some inconvenience. The local reaction consecutive on the injection is somewhat marked, but is never accompanied by an accident; resolution, without suppuration or mortification, is almost invariably the rule.

Experiments in the Domain of Forensic Chemistry. By H. Struve (*Zeitschr. Anal. Chem.*, xii, 14—27).—*The Detection of Prussic Acid.*—In a case of poisoning with potassium cyanide, prussic acid was detected in the blood and tissues, by distilling them with water and a few drops of tartaric acid, and applying to the distillate the usual Prussian blue and sulphocyanogen tests. The first gave in each case negative, the second, positive results.

Experiments undertaken to show the presence or absence of sulphocyanogen as a normal constituent of the body led to negative results, except in the case of the saliva. Traces, however, were found in one case in blood from a liver.

In another case of poisoning with potassium cyanide the examination of the tissues did not take place till eight months after death, and then no trace of prussic acid could be found, but formic acid was present, and this was considered by the analyst to be a proof of death from potassium cyanide, the formic acid being produced by the decomposition of the cyanide.

The author's experiments on the point led to results which contradicted the conclusion that the formic acid was produced by the simple decomposition of the cyanide.

Of the tests for prussic acid, the best is undoubtedly the sulphocyanogen reaction; but as both sulphocyanic acid and sulphocyanate of ammonium are volatile, a few drops of caustic potash should be added before concentrating the liquid previous to the addition of ferric chloride. The blue colour produced by prussic acid in a solution containing tincture of guaiacum and a copper salt affords a means of detecting extremely minute traces of it, but other bodies besides prussic acid gives the same reaction.

THE VETERINARIAN, FEBRUARY 2, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

COMPULSORY SLAUGHTER OF CATTLE AFFECTED WITH PLEURO-PNEUMONIA, AND THE DISPOSAL OF THE CARCASES.

BEFORE the recent order of Council established compulsory slaughter of cattle affected with contagious lung disease, it was customary to consign such animals to the butcher if the disease were decided sufficiently early, and the animal were in a condition to render the proceeding safe. It is scarcely necessary to state that, with few exceptions, the carcases of cattle which have been slaughtered on account of pleuro-pneumonia have been sold for the food of man; the small proportion which have been otherwise disposed of were kept out of the meat market, not because the animals were victims to lung disease, but simply for the reason that the meat was unwholesome in appearance, and therefore would not escape the notice of the meat inspector. A miserable worn-out old cow with lungs free from any morbid deposits would be unfit for the shambles on account of the pale and sickly cast of the moist flabby meat; while a well-fed beast, although affected with pleuro-pneumonia, would supply joints of prime beef, faultless in aspect, and quite secure of the meat inspector's favorable verdict.

To put the matter more sharply, two joints may be taken, one from a fine ox which has been affected with a deadly, infectious disease, say cattle plague; and another from a healthy animal which has been badly fed, and altogether hardly treated; and any butcher, knowing nothing of the circumstances, would unhesitatingly select the one from the plague-infected animal. This statement is tantamount to the assertion, which is not contradicted, that certain fatal diseases in the early stage leave no marks of their presence in the flesh when the animal is properly dressed. The most critical eye can see nothing with or

without the aid of the microscope in the meat of an animal in good condition, notwithstanding that the animal was the subject of a virulent disease at the time of its slaughter.

This fact, however, affords no grounds for a conclusion as to the actual qualities of the meat of diseased animals. As the matter now stands there is, in the majority of instances, absolutely no proof of the fitness or unfitness of such meat for human food. Undoubtedly, some kinds of diseased meat are injurious to animals, as we have lately shown in the history of the outbreak of a blood disease at Stoke-under-Ham, Somerset; but there the meat carried in itself the evidence of its unfitness for consumption.

A physiologist may feel bound to assume that disease of any kind renders the flesh unwholesome; but the assumption is purely gratuitous, and it is quite within the bounds of possibility that it may be entirely upset by experiment; and it would be quite worth while to settle the matter at once. There would be no lack of subjects on which to test the effects of the meat if it were known that supplies of what we may term pleuro-pneumonia beef, to all appearance of the finest quality, might be obtained gratuitously at a much reduced rate for a limited period.

In the present state of the case the question is not settled either physiologically or legally. The Nuisance Removal Act provides that the medical officer or inspector of nuisances may enter premises to inspect animals or carcases, &c., and may seize the same and have them dealt with by a justice, and if the justice is satisfied that the animal, &c., is diseased or unwholesome he shall order the destruction of it, or at any rate take measures to prevent its use for the food of man.

Under these provisions the local authorities in some parts of the country have no alternative but to condemn meat, whatever its appearance may be, which the inspector or the medical officer certifies has been cut from an ox which was killed while suffering from pleuro-pneumonia; and in those cases where the diseased animals have been slaughtered by order of the authorities no further evidence of disease is necessary to justify the destruction of the carcases. Hundreds of animals affected with foot-and-mouth disease and other febrile affections would be, strictly speaking,

included in the same list, but the difference is that they are not slaughtered by order, and the meat inspector only sees the carcase and knows nothing about the previous existence of disease, of which he sees no trace in the meat; but when the slaughter is compulsory, on the ground of the existence of disease, the carcase it appears is *ipso facto* condemned to be destroyed. If the meat is unwholesome, this is wisely done, as far as it goes, but it does not go far enough. If, however, the meat is harmless, and not to be distinguished from the meat of healthy animals, as far as its influence on the human being is concerned, then the destruction of hundreds of carcases is a lamentable waste of food; at any rate, the point might and should be determined by experiment. While people are eating meat from animals affected with various febrile diseases, and are eating it in ignorance, there would be no more risk incurred if a certain number of persons agreed to eat the same kind of meat knowingly, and there would be a manifest advantage attending the observation of the effects of the consumption of such food. If it results that meat from animals which have been killed while suffering from fever is injurious, it will be necessary to modify the system of inspecting meat very considerably before we can hope to prevent the consumption of the flesh of diseased animals when the affection is of such a nature that no detectable change in the flesh is produced.

Extracts from British and Foreign Journals.

ON FOOT-AND-MOUTH COMPLAINT OF CATTLE AND OTHER ANIMALS; WITH REMARKS ON THE GENERAL CHARACTERS OF THE DISEASE AND THE CAUSES WHICH LED TO ITS RECENT EXTENSIVE PREVALENCE IN THIS KINGDOM.

By G. T. Brown, Chief Inspector in the Veterinary Department of the Privy Council, and Professor of Physiology and Therapeutics in the Royal Veterinary College.

History of Foot-and-Mouth Disease.

Epizootic aphtha, eczema, or foot-and-mouth distemper, is well known in this kingdom; its origin, like that of infec-

tious and contagious disorders in general, is wrapped in mystery. Obviously it had a beginning, and the first animal attacked could not have taken the disease from a previously affected animal; but of the causes under which it first arose we know no more than we know of the origin of evil.

The fact is admitted that foot-and-mouth disease is highly contagious; it can be certainly communicated by association of diseased with healthy animals; and the direct or indirect conveyance of the poison which is contained in the secretions, especially in the saliva, to a healthy animal, usually produces the disease. In the absence of the specific virus, however, no combination of causes has been known to occasion the malady; and it is therefore unreasonable to assume that hardships of any kind are capable of inducing it. Outbreaks commonly occur in situations where no direct or indirect contact with diseased animals can be traced, but the same statement applies with equal force to all forms of contagious and infectious disease of man and animals; the difficulty must be accepted as real, and if it is necessary to assume something, in order to explain the occurrence, it appears to be more logical to admit that the poison, which is known to have the power to induce the disease, has been carried in some undiscovered way, than to speculate on the possible existence of new causes, of which nothing can be demonstrated, and of the operation of which in the production of the disease no single instance can be adduced.

Vesicular diseases among cattle were evidently well known to the earliest writers on epizootics. Mills refers to a malady among cattle in Germany and Italy which was introduced from Hungary in 1711, and which was distinguished by some of the prominent features of the foot-and-mouth distemper of the present time. The tongue was inflamed and covered with blisters, and there was a constant discharge of saliva, which being dropped on the grass, communicated the infection to sound cattle. A little later a similar disease existed in Moravia and also in France, and according to Mr Finlay Dun, it extended to Great Britain about the middle of the eighteenth century. In 1810 a similar aphthous affection appeared in many parts of France. In 1834 it was prevalent in Hungary, Lower Austria, Bohemia, Saxony, and Prussia. In 1837 an aphthous disease occurred among cattle in the Vosges, and soon afterwards in Switzerland. The affection extended over France and Holland, and reached England in 1839.

Whether or not the disease which attacked cattle in this

country in the middle of the eighteenth century was allied to or identical with foot-and-mouth distemper cannot be determined. The records of animal plagues are obscured in the earliest works by the use of terms which now have no definite meaning, as blain, murrain, or distemper; but there is no doubt whatever of the identity of the vesicular disease which attacked our cattle in 1839 with the present foot-and-mouth complaint; indeed, there is ample evidence of the continued existence of the affection in the United Kingdom from that time.

Professor Simonds first saw foot-and-mouth disease among animals at Laleham, near Twickenham, in September, 1839, and it appeared from his investigations that the malady was introduced on the farm at Laleham by some sucking calves which were brought to Smithfield market. The first animal which was attacked at Laleham was a cow which suckled one of the affected calves. Further inquiry led to the discovery that the disease first appeared in the neighbourhood of Stratford, near London, whence it was conveyed to Smithfield, and having once obtained an entrance into the cattle markets it may be easily imagined how rapidly it would spread throughout the country. Unrecognised at the time, and its nature unsuspected, it would not be likely to attract much attention until it had assumed alarming proportions. This soon happened.

The county of Norfolk was the next to suffer, then Essex, in consequence of the movement of cattle from the London market. Some Devon cattle at Langley Grange near Loddon in Norfolk were attacked in November, 1839, about the time of the appearance of the disease at Laleham; and almost immediately afterwards, if not at the same moment, it was discovered in Scotland. Ireland certainly suffered from its invasion soon after it reached Great Britain.

In the census of Ireland for 1851 it is stated that in the year 1841 a disease, characterised by stiffness of the limbs and blisters on the tongue, spread among sheep in county Clare, and affected cattle, sheep, pigs, and goats in all parts of Ireland.

Professor Ferguson, in a pamphlet which he published in 1842, refers to a pustular affection of the nose, mouth, and feet of cattle which appeared three years before that date, about the time of the complaint appearing in England. How foot-and-mouth disease was introduced into the United Kingdom has never been ascertained; but the evidence points to Holland or France as the centre from which the malady was communicated. It is true that foreign animals were not permitted

to be landed on our shores between 1833, when the first prohibitory Order was passed,* and 1842, when a relaxation was sanctioned,† but it is quite probable, as Professor Simonds has suggested, that the disease may have been introduced by ships' stores; that is to say, animals carried on board for the use of the passengers and crew during the voyage. It constantly occurs that one or two pigs, and now and then a cow or two, and some few sheep, remain on board on the arrival of the vessel in this country, and such animals are allowed to be landed and removed with the certificate of a veterinary inspector. A store animal might have contracted the affection when the vessel touched at a French and Dutch port, and on arriving in this country may have been released without suspicion, and possibly have found its way into the Smithfield market. Other explanations have been offered, such as the illegal importation of cattle, communication of infection by means of foreign hides, or by the clothes of persons who have been in contact with diseased foreign animals; but these suggestions are not so satisfactory as the one which refers the disease to the removal of a diseased or infected pig or cow from a homeward vessel.

Fairly stated, the evidence of the introduction of the disease from the Continent is vague, and the result arrived at is not capable of proof; but must rather be taken as an induction than as a conclusion. The facts are briefly these:— In 1839 foot-and-mouth disease prevailed in Germany, Holland, and France. In the same year it reached England, Ireland, and Scotland; countries which had previously been free from the disease, or at least had not suffered fron it, or any disease resembling it, for a century. The fact that this immunity was enjoyed, notwithstanding the prevalence of the disease in various parts of Europe, at different times, is worthy of remark. No prohibition against the importation of foreign cattle existed before 1833, and it is a matter of history that foreign animals were imported up to that time, not probably in large number, but presumably to a far greater extent than during the years when importation was altogether forbidden.

After a few months of prevalence, foot-and-mouth disease became so widely spread that the Royal Agricultural Society ordered an investigation into the origin of the disease and the best means of dealing with it.

Professor Sewell was the veterinary adviser of the Society at that time, and under his direction a circular was

* 3rd and 4th William IV, c. 52.

† 5th and 6th Victoria, c. 47.

issued on April 8th, 1840, in which the disease is thus described:—

In some animals it commences between the claws, and in others it appears to have begun in the mouth; in others a stiffness of the legs is first perceived, as if treading upon thorns and briars; then follows a discharge of saliva from the mouth, and a champing of the lips, accompanied with blisters on the tongue, palate, and lips; the blisters peel off; loss of appetite and general debility ensue.

After this account of the symptoms of the disease, written in terms which might be properly employed now without variation, certain directions are given as to treatment of the diseased animals.

Great stress is laid on good nursing; mild laxatives followed by tonics are recommended, with astringent lotion for the mouth; poultices to the feet, and afterwards styptics or caustics, according to circumstances.

Perhaps this system of treatment, in the hands of Professor Sewell, might in some cases have proved beneficial; but in general practice, with such variations and additions as each practitioner felt inclined to employ, its results were entirely disastrous; and it must be admitted that the remarkable fatality which attended the progress of the disease in 1840-1 was in great degree due to the recklessness of the medical treatment employed. Another circular was issued by the Society in February, 1841, for the purpose of obtaining information in respect of the causes of the disease and the conditions which favour its spread. The farmers who were addressed responded to the inquiry by giving their ideas on the subject, as well as the results of their observations; and a report embodying the information thus gained was published in the Society's Journal for 1841, but no light was thrown on the introduction of the malady, or the means of preventing its spread.

The outbreak of 1839-40 was the most severe of any which has occurred in this kingdom. Cattle were not the only victims, but the disease attacked sheep, pigs, and poultry. Sheep suffered to a remarkable extent, the feet as is usual in these animals being most severely affected, and it is recorded that in 1841, after a market at Smithfield, it was not uncommon for persons employed in sweeping the market-place to collect basketfuls of the hoofs of sheep and pigs, which had been cast off during the day; and it was certainly not unusual to see the hoofs fall off the feet of pigs while the animals were being lifted into carts to be carried away for slaughter. Sloughing of the hoof-horn may indeed be looked on as one of

the results of foot-and-mouth disease; but it has never since happened to the extent that it occurred in 1841.

While the outbreak of 1839-40 was excessively severe, its duration was not prolonged beyond the period of two years. In 1842 the disease had considerably abated, and the cases which occurred presented a much milder type.

Another outbreak, or accession of disease, is recorded to have occurred in 1845. In that year Norfolk again suffered severely fron extensive ravages of the malady, as it had done on its first introduction in 1839. The outbreak of 1845 will be remembered in Norfolk, owing to the circumstance of the disease being so rapid in its progress that St. Faith's Fair was prohibited. The origin of the outbreak is not known.

The prohibition against the importation of foreign stock was removed in July, 1842; foreign animals were allowed to be landed, on payment of a duty varying from 1*s.* to 20*s.* per head. No increase of disease was noticed during the three succeeding years, and there is no evidence to show whether foot-and-mouth distemper was directly imported in 1845, or extended from the centres which then existed in this country.

Again, the disease gradually declined. The duty on foreign stock was removed in March, 1846, and a great increase in the number of foreign animals imported immediately resulted, but no fresh outbreak of foot-and-mouth distemper occurred until 1849, when it is reported to have prevailed extensively among cattle and sheep in Scotland, and by 1852 it had extended over the whole of the country, appearing in many isolated places. A gradual decline appears to have taken place until 1861, when the number of attacks again rose considerably. The records of the progress of the affection during this time, and indeed at all times, are very meagre, the disease being too trifling a matter, it would seem, to occasion much excitement.

From 1861 the affection continued to prevail for several years. In 1862 it was detected among some Breton cattle in the Royal Agricultural Society's Showyard at Battersea, and it was undoubtedly the case that the distribution of the animals all over the country, at the conclusion of the show, caused the disease to be widely spread. Shortly after the Battersea exhibition of stock, foot-and-mouth disease existed in a malignant form among cattle and sheep at Harrow; but in this case there is reason to believe that the disease was

associated with blood poisoning, owing to the contamination of the land with sewage mater which was retained by the tenacious soil.

In 1863 an outbreak of foot-and mouth complaint occurred among the cattle at the show of fat stock of the Smithfield Club. During that and the following year, however, the disease declined.

The first attempt to control the spread of foot-and-mouth disease by legislation was made in 1864, when a Bill was introduced by Mr. Bruce and Sir George Grey on February 19 to make further provision for the prevention of infectious diseases among cattle. Foot-and-mouth disease was included in the schedule as an infectious disease, but the opposition to the introduction of any restrictive measure in relation to that disease was so decided on the part of leading agriculturists and persons connected with the cattle trade, that it was struck out of the Bill as amended in Committee. The general allegations were that the proposed restrictions would hamper trade, and would not effectually get rid of the disease, while the loss which would be occasioned would be more serious than that inflicted by the malady when allowed to run unchecked.

In the spring of 1865 foot-and-mouth disease was again extensively prevalent. When cattle plague appeared, foot-and-mouth disease was rife, and numerous opportunities occurred of comparing the morbid appearances of the two diseases, and tracing their progress in the same animal. So virulent was the attack of the foot and mouth complaint in some instances that the condition of the mouth resembled the state of that part in the worst forms of cattle plague so closely as to attract special attention, and even in some instances to give rise to a suspicion of an outbreak of the plague.

Among the great outbreaks of foot-and-mouth disease, that of 1865 will always occupy a remarkable position, owing to the alleged influence of the cattle plague restrictions in arresting the progress of the malady, and, according to some, completely eradicating it from the country.

It is undoubtedly true that foot-and-mouth disease declined in the latter part of 1866, and during the greater part of 1867 there were very few centres of infection; at least, little notice was taken of the disease, but it is entirely fallacious to assert that the malady ceased entirely until it was re-imported from abroad.

Cattle plague restrictions, as the repressive measures are commonly termed, including stoppage of the movement of

cattle all over the country, except by licence, and under strict regulations, between sunrise and sunset, holding of fairs and markets only by licence, declaration of infected places, with prohibition of movement of cattle out of such declared areas; and not least, the establishment of a sanitary cordon round the metropolis, were commenced on March 24, 1866, and were continued by successive Orders of Council, with slight modifications, until they were revoked by an Order of Council dated June 16, 1868.

At the time of the institution of these restrictions the foot-and-mouth complaint had prevailed in a severe form for more than a year, and it continued to exist certainly for nearly another year while they were in operation.

No serious increase in the number of attacks took place in 1868; during that year several fresh outbreaks were reported. The disease did not, however, assume alarming proportions, and but little notice was taken of it. At the same time it is to be remarked that the cattle-plague restrictions ceased to operate in June, 1868, and cattle were moved with perfect freedom everywhere excepting the metropolis, round which the sanitary cordon was still retained.

General acceptance has been given to the statement that foot-and-mouth disease was arrested, if not exterminated, by the operation of the regulations which were directed to the extermination of cattle plague; but it must be admitted that the grounds on which this conclusion is based are exceedingly slight. The bare fact that foot-and-mouth disease declined after two years of prevalence would have called for no remark if it had occurred, as in previous outbreaks it did occur, independently of any restrictions; but taken in connection with the existence of stringent regulations in respect of the movement of cattle, the event was naturally, and without hesitation, ascribed to their influence; and there was something so completely satisfactory in the belief of the advantages which were presumed to have been gained by submission to annoying restrictions, that no one thought of casting a doubt on the popular faith, nor, indeed, was it worth while to inquire into the grounds of its acceptance, until it was vitiated by the gratuitious assertion that Great Britain was free from foot-and-mouth disease on cessation of cattle plague, and did not again suffer from it until the affection was introduced from abroad, a proposition quite opposed to the facts which have just been advanced. *Post hoc, ergo propter hoc,* involves a principle which philosophy repudiates, nevertheless philosophers, as well as other

people, constantly accept the principle as a basis of argument.

The spring of 1869 was marked by what may be termed the commencement of the last great outbreak, which has only recently ceased. Not only in this kingdom, but also on the continent, the disease spread with remarkable rapidity, most probably under the influence of those unknown laws which regulate the spread of epizootics. Diseased animals were landed on our coasts from nearly all the continental ports, and there can be no doubt that infected foreign animals which were moved into the country contributed to spread the disease, as a regulation for the slaughter of the whole cargo in the event of the discovery of foot-and-mouth disease did not then exist.

In August, 1869, foot-and-mouth disease was, for the first time in this country, included among infectious diseases by Act of Parliament; and it became a penal offence to move an animal affected with the disease on public roads or rivers, or to expose it in a fair or market. An Order of Council subsequently issued required the owner of such animal to give notice of the existence of disease, and the Inspectors or the Local Authorities were required to make returns of the number of cases within their districts. Notwithstanding this attempt to arrest the disease by legislation it continued to spread.

In December of that year an outbreak of foot-and-mouth disease among cattle at the Smithfield Show at Islington occasioned considerable inconvenience. Provisions had been made under the Order of Council, which was necessary to enable the Club to hold the exhibition, for the removal out of the metropolis of the cattle exhibited if no outbreak of contagious disease occurred. On this occasion everything went on satisfactorily until the Show was over and a large portion of the stock had been removed.

On the Friday morning, the last day of the Show, all the cattle were separately examined without the detection of any case of disease; but on the following morning, at 10 o'clock, a Devon ox was found to be suffering from the incipient stage of the malady. The remaining cattle, about 45 in number, were detained until arrangements could be made for their slaughter in the metropolis. All the cattle were removed by licence between Monday and Tuesday, but before the Hall was cleared six other animals gave evidence of disease. There was nothing remarkable in the outbreak save the fact of the cattle remaining healthy in the Hall for eight days, while the ordinary period of incubation of the

disease is three days. It could not be reasonably concluded that the Devon ox which was first attacked had been infected before entering the Show more than a week previously, and the only alternative presumption was that the infection had been introduced by persons who had entered the Show after attending to, or being in contact with, diseased cattle, either in the metropolitan market where the disease was prevalent, or in some of the London dairies.

In this year Ireland, which had been tolerably free from foot-and-mouth disease for some time, suffered from the introduction of diseased cattle which were sent from Bristol Market and exposed for sale in one of the Irish stock markets. From this centre it is alleged the disease spread very rapidly over the country.

In England the malady continued to extend, and a few local authorities applied for the establishment of more stringent rules. The applications were granted, and the movement of diseased animals, and of animals which had been herded with them, was prevented by Order of Council. This measure, however, was quickly revoked, in consequence of the almost universal opposition with which it was met.

During 1870 the ravages of foot-and-mouth disease rather increased than abated. According to the returns many fresh outbreaks happened every week.

In December the disease again showed itself in the Smithfield Show. On the last day of the exhibition one of the cattle, a cross-bred ox, was found to be affected. In this case the animal gave evidence of ill health on the mornng of the day, but the distinctive symptoms of foot-and-mouith disease were not developed until 4 o'clock in the afternoon. Accordingly the movement of the cattle out of the metropolis was interdicted to the consternation of owners and salesmen, who at once addressed the Government on the subject, and represented the serious loss which would be incurred if all the animals were slaughtered in the metropolis. After considerable discussion arrangements were made for the removal of the healthy cattle into the country for slaughter on the following conditions. Every animal so removed was to be examined by one of the Inspectors of the Veterinary Department, and certified to be free from evidence of infectious or contagious disease. Each animal was to be moved in charge of a person approved by the Veterinary Department, and the person selected was required to remain in charge of the animal until the slaughter took place, and then to certify the fact to the Department.

All expenses attending the carrying out of these conditions had to be defrayed by the owners or purchasers of the cattle; and notwithstanding the amount of trouble and expense involved, the conditions were agreed to almost without exception by those who were entitled to take advantage of the concession.

The year 1871 was distinguished by the extensive prevalence of the disease all over the kingdom. Ireland is reported to have received diseased animals from us in May, and it is a matter of fact that during this year the complaint reached every one of the counties in Ireland.

Great Britain returned to the Veterinary Department more than 52,000 fresh outbreaks in the course of the year, and it may be taken as an undoubted fact that the return did not include more than a reasonable proportion of the cases which actually occurred. Foot-and-mouth disease again appeared at the fat stock exhibition of the Smithfield Club in December of this year; but owing to the action taken there was less inconvenience experienced by the exhibitors than was suffered by them on the former occasions which have been noticed.

Before the Show was held the Council of the Smithfield Club took an agricultural view of the subject, and succeeded in obtaining an Order of Council so worded that only the diseased animals, if any, would be necessarily slaughtered in the metropolis. The usual arrangements in regard to inspection were made, and a shed was set apart for the reception of diseased animals, which was, unfortunately, well filled.

Almost the first animals which arrived came from the Birmingham Show and were found to be suffering from the disease. The diseased cattle were not allowed to enter the Show, but were placed in a shed provided for the emergency. This precaution, however, did not in any way protect the healthy cattle, which sometimes were carried in the same vans with the diseased, and it was, therefore, naturally expected that the affection would spread.

Early in the week of the Show many of the cattle began to show signs of illness, and by the end of the week more than 70 of them were suffering from foot-and-mouth disease, besides those (18 in number) which were excluded from the Show in the first instance, and handed over to the local authority.

In the beginning of 1872, the returns which had, since the passing of the Act, been required from the local

authorities, were no longer demanded, and it is therefore impossible to make any satisfactory comparison between the state of prevalence of the disease in 1871 and 1872. From various sources, however, information was obtained from time to time, and the evidence altogether leads to the conclusion that in the latter part of this year the decline of the disease began, although many fresh outbreaks occurred in the country.

On the continent there was no abatement of the progress of foot-and-mouth complaint. Cargoes of animals among which disease existed were constantly landed at our ports during the year, but owing to the rigorous adoption of the regulation which condemned the whole cargo to slaughter if one animal was affected with the disease, no extension of it occurred from this cause; in fact, while the affection was declining in many parts of England it was spreading with rapidity in Germany, including Schleswig and Holstein, and other parts of the continent. Toward the end of the year the decline of the malady became more marked, and it continued through the spring and summer of the present year, with occasional fresh outbreaks in different parts of the country.

The precautions taken by the Council of the Smithfield Club to prevent the entrance of diseased animals in 1872 were exceedingly stringent. Cattle which had been exhibited at any show within three months previously to the Smithfield Show were not allowed admission, and very precise rules were established relative to the manner of transit, cattle only being allowed to travel in horse boxes or private conveyances.

The means adopted were perfectly effectual; no diseased animals were detected at the entrance of the Show-yard, and no outbreak occurred during the Show, although it is probable that some of the cattle were infected while in the Hall, as they showed symptoms of the disease immediately after their return home.

During the present year (1873) the decline of foot-and-mouth disease has steadily continued, and at this time (the month of August), when the disease would, according to the rule which has obtained for the last three years of its prevalence, have nearly reached its maximum, it is in a minimum condition in this country, and, so far as our information reaches, on the continent also. For some months past very few cases of the disease have been detected among the foreign animals landed at our ports. Ireland also is reported to be nearly free from the affection.

The history of foot-and-mouth disease might be considerably extended by reference to the records of its progress in various parts of Europe, Africa America, and Australia. No contagious disease of animals is so widely spread, and certainly none is more readily communicated from diseased to healthy stock. In no European country has the malady been eradicated by legislative measures, although restrictions on the movement of cattle have always succeeded in keeping it in check. In Australia the adoption of severe measures immediately on the discovery of the disease effectually arrested its course, and the prohibition of imports of cattle from England has since kept it out of the country. Our position as an importing country forbids us to hope for the eradication of the distemper after more than thirty years' constant existence here, by the adoption of measures which would be effectual on its first appearance in a country; nor if we succeeded in completely eradicating the malady from the whole kingdom could we expect to avoid its re-importation, unless we consented to hamper the foreign cattle trade by insisting on the slaughter at the place of landing of all foreign animals without exception—an extreme measure which is not likely to be adopted on account of a disease which is not fatal in its results, and one which people have learned to look upon as indigenous to this country. Experience of the last few years goes to show that even moderate legislation directed against this affection will not find any support from owners of cattle, or persons concerned in the cattle trade, and in the face of this experience it would be idle to attempt to carry out more severe measures, which to be effective must be permanent in their operation.

Much may be done by stock owners to prevent the spread of foot-and-mouth disease if they think the matter of sufficient importance to deserve a little trouble and attention. To this end certain suggestions will be offered under the head of Prevention.

Causes which contribute to the Spread of Foot-and-Mouth Disease.

Most prominent among the influences which regulate the extension of foot-and-mouth complaint and other contagious maladies, is the varying degree of susceptibility of the animal organism to be acted on by the specific poison. The history of animal plagues proves beyond question that under appa-

rently similar conditions a disease will at one time appear in isolated positions, and confine its attack to few animals, while perhaps in the succeeding season its spread is rapid and extensive, and all the subjects within reach of the infection are indiscriminately included.

Foot-and-mouth disease is no exception to this rule; since its introduction into this kingdom in 1839 it had manifested itself at certain periods in the form of an epizootic, ravaging extensive tracts of country, and having exhausted its force on the susceptible animals within its reach, has declined until it reached a minimum. Sometimes the affection assumed the character of an enzootic, but in these instances there was always a reasonable explanation of the limited spread of the disease, in the circumstances of the locality; either the cattle population was small, or the district was out of the way of cattle traffic, and the affection having attacked the animals in the place, ceased for want of new material.

In reference to the direction which epizootic diseases take, there is a general belief that they always proceed westward, and there is some evidence in support of this view; but so far as foot-and-mouth disease, and indeed all other infectious maladies of stock are concerned, the rule has no existence in this kingom. Railways radiate in all directions, and it may be assumed with safety, that from the centres of disease the virus will be conveyed wherever the lines of cattle traffic extend.

Granting the influence of susceptibility in modifying the progress of contagious diseases, the chief cause of their spread is the movement of diseased and infected animals in the ordinary course of trade; and very curiously this practically vital point in sanitary law has received the least attention, not from the legislature, but from the stock-owner.

If a critic wished to secure attention to his remarks, he would carefully avoid such a commonplace statement as that which refers the extension of disease to the movement of infected animals, and proceed to a discussion of the possibility of spontaneous origin, the existence of minute spores of fungi, atmospheric changes, and indirect conveyance of the poison by flies, birds and the smaller quadrupeds, which, if not themselves liable to be attacked with the disease, may carry on their feet, or other parts of their bodies, the excreta from diseased animals.

Full weight may be allowed for all the mischief done by the indirect conveyance of infection by men, animals, or substances which have been in contact with diseased

beasts, or with the products of the disease; but still the fact remains, that the malady is kept in a state of activity mainly by means of the living creatures which are suffering from it. During the inquiries which have at different times been instituted in the country for the purpose of determining the causes of the extraordinary prevalence of foot-and-mouth disease in certain districts, the fact above stated has invariably been brought out very prominently. Difficulties have been met with in the endeavour to account for the introduction of the affection; frequently it has been impossible to define the actual date of the outbreak, and more often than otherwise it has been necessary to suggest several possible or probable channels of communication with distant centres of infection; but when the existence of a single case of the malady is admitted, it is always easy enough to account for the spread of the infection. No better illustration of the conditions under which foot-and-mouth disease spreads with excessive rapidity can be found than the one which was afforded by the county of Somerset, at the time when the malady prevailed there in the summer and autumn of 1870.

Before the inquiry was commenced, a general statement had been made, and commonly accepted, that animals, principally Irish cattle, bought in Bristol market, introduced the affection into the county in the first instance, and constantly kept up the supply of infection. This statement was not unreasonable, and was therefore taken as a basis in the subsequent investigation. Very shortly, however, it appeared that Irish cattle from Bristol market were not solely, or even in the greatest part, responsible for the condition of the cattle in the county of Somerset, and in many instances they had nothing at all to do with the original outbreaks.

In the Frome district, the first outbreaks were traced to the introduction of pigs from Bristol and Salisbury markets into the market at Frome. Dealers are in the habit of moving pigs from one market to another. These animals are least likely to attract observation when suffering from foot-and-mouth disease, and, either in railway trucks or market carts, may be moved all over the country with impunity. Numerous outbreaks of the disease were traced to exposure of diseased pigs in the markets, and, although the dealers were sometimes fined for the offence, it did not appear that the practice was checked. Probably the general immunity which was enjoyed by those who systematically evaded the law in this way sufficiently encouraged them

to continue to incur the slight risk of detection and possible punishment. Considering the loss which dealers would have suffered if they had acted in strict accordance with the law, it is scarcely a matter for surprise that they ignored all the regulations, the observance of which would have seriously interfered with their trade.

In the Glastonbury district, where the disease prevailed to a serious extent, many outbreaks were traced to the introduction of infected cattle from Bristol market; but there were also other sources of infection to be taken into account. One particular instance of the movement of diseased cattle for a long distance without detection of the existence of disease, attracted my attention at the time. The cattle were purchased at Southampton and taken to Glastonbury, whence they were driven across the moors to the owner's premises. Foot-and-mouth disease was discovered among them the day after their arrival, and due notice was given to the authorities; but the facts which subsequently transpired proved that they must have been affected for some time previously, as they left a line of infection behind them; the disease appeared in nearly every place through which they had passed on their route.

In the Wells district foot-and-mouth disease was introduced repeatedly by cattle brought from Bristol, Chippenham, and Frome markets.

In the Bridgwater district disease was introduced originally from Bristol market. The first outbreak occurred at Huntspill, and from that point the affection extended to cattle which were grazing on the Pawlet Hams, where there were no means of isolating diseased animals or applying sanitary regulations to check the spread of infection. No mystery attached to the origin of the disease in any of the districts where it prevailed. There was no occasion to suggest possible means of communication of the virus through the medium of the atmosphere or other less direct channels. The fact was patent enough that diseased and infected cattle, sheep, and pigs, were regularly moved by road, rail, and boat, from various parts of the kingdom to fairs and markets. Seizure of diseased animals did not materially lessen the mischief done, and the more effective measure, the prevention of the movement of those which had been herded with them, could not be carried out without an entire stoppage of the cattle trade.

Irish animals were frequently landed at Bristol and other ports suffering from the disease sent to the markets and distributed over the country, carrying the affection with them

wherever they went; but home-bred animals also suffering from the disease were moved with equal freedom and at least to an equal extent, and no remedy could be effectively applied to the one class of animals without including the other. In short it was clear, during the time of greatest prevalence of the disease, that nothing less than a general interruption to the movement of cattle all over the kingdom would be sufficient to control its progress.

Bristol market was for some reason specially selected for attack as the great centre of infection; but a careful investigation proved that, even in the county of Somerset, Bristol was by no means the only distributing centre. The markets at Southampton, Salisbury, and Frome, it was ascertained, had contributed their share of diseased and infected cattle and pigs; and it is certainly true that more attention was paid to the cleansing and disinfection of Bristol market than to any other market in the country. Under the direction of the Inspector, who had full powers to act, the place was well swept after each market. The ground was covered with quick-lime; and lime wash with carbolic acid was applied to the walls of the pens in which cattle had been placed. All the sweepings and manure from the market were removed to the farms in the occupation of the lessee, whose cattle did not suffer in consequence, as it appeared on inquiry that he had only had two outbreaks of disease on his two farms for several years; in each case the affection was introduced by cattle which he purchased in the market.

It must be obvious that no amount of care in cleansing and disinfecting market places, or other places where cattle are kept, can in any degree prevent the extension of disease from the movement of diseased or infected animals. These cleansing processes, if properly carried out, may be presumed to prevent the extension of disease from the presence of active contagium left by diseased animals which previously occupied the lairs or other places. More than this cannot be expected.

Having discovered the sources of infection in the county of Somerset, there was no difficulty in explaining the rapid spread of the disease. The presence of a single diseased animal, for example, on the Pawlet Hams, could not fail to occasion the wide extension of the affection, and taking the vast grazing district round Glastonbury, practically an open plain, as the pastures are only separated from each other by dykes or slight fences, there are no sufficient barriers to the association of diseased and healthy animals, it is at once apparent that in such a position an infectious malady must

spread. Isolation and disinfection are utterly impossible of application, and under such conditions the disease advances without any check, until all the susceptible animals are affected.

Exposure of diseased animals in fairs and markets has in very many instances caused the distribution of the disease over a wide extent of country; and, unfortunately, no amount of vigilance on the part of the Inspector of the market, or of energetic action on the part of the Local Authorities, can prevent the mischief. Diseased animals may be seized, and the owners fined for exposing them, but meanwhile the virus has done its work in the system of many animals which were healthy on the day of the market, but which, in a few days' time, will certainly exhibit the disease. In Bristol market, owing to the unceasing vigilance of the Inspector and the determination of the authorities to carry out the law, nearly all the Irish dealers were fined in turn for exposing diseased cattle or pigs in the market; but however necessary this course might be for the purpose of deterring others from committing a like offence, it is doubtful if any sanitary gain resulted. The seizure of the diseased animals did not prevent the infection of others in the market, and the punishment inflicted on the dealers induced them to obtain the aid of a veterinary surgeon to inspect their stock on the morning of the market and select all which gave evidence of disease: these were, of course, kept on the premises or otherwise disposed of, and those which had been up to the market day herded with them, but were not then discoverably affected, were sent to the market and sold to carry the disease to all parts of the country. Owing to this arrangement it happened that for some months during the prevalence of the disease no diseased animals were to be found in Bristol market; the fact, however, of there being a considerable number of infected animals there was perfectly well known at the time, and was abundantly proved by the numerous outbreaks which occurred among the animals after they arrived at their destination.

Cleansing and disinfection of markets and lairs attached to them is far more easily suggested than carried into effect. Often it happens that the cost of the work would be almost ruinous owing to the extent of surface to be gone over. Not unfrequently the position of the market place, the streets in the town for instance, or a large field, renders any effective cleansing and disinfecting impracticable, but in such instances there is good reason to believe that the atmosphere does all that is necessary to be done before the next market. Some

markets and lairs are conveniently arranged for the application of disinfectants, and such application should always be insisted on, at least on every occasion when diseased animals are exposed for sale. But after all, observation is in favour of the belief that little harm arises from the morbific matter which is left in an open market by one or two diseased animals on a market day. A few days' exposure to air and moisture will be sufficient to neutralize the poison; but undoubtedly, much injury is produced by turning animals out of a market into adjacent lairs to wait till the next market day, such places become, in times of prevalence of the disease, centres of infection which should be dealt with stringently, and regularly cleansed and disinfected under proper supervision.

Movement of diseased animals along public roads, or in any way, by land or water, is admitted to be a fruitful cause of the spread of the affection. The secretions and excretions, more particularly the saliva, which flows abundantly from the mouth of the diseased beasts, are certain to communicate the disease to cattle, sheep, and pigs which are moved along the same roads or are conveyed in the same trucks or vessels, immediately after the diseased animals have deposited the morbific matter.

Much of the injury done by transit of diseased cattle and other animals cannot be prevented by any care. It is impossible to disinfect roads, or even to ascertain at what points the virus has fallen. Pens at railway stations are in some respects equally difficult to deal with. Their chief use is for the reception of animals for the purpose of trucking, and on market days they are in constant requisition for many consecutive hours, as one lot of animals after another arrives at the station to be put into the trucks. A single diseased animal, which may occupy one of the pens for a short time in the early part of the day, may leave behind enough of the morbid matter to infect a considerable proportion of those which immediately follow, and until the work of the day is over it is impossible to disinfect the pens; indeed, when the hours of daylight barely suffice for the work of getting the animals off, the delay would disarrange the whole proceedings. The most that can be done, is to insist on the cleansing and disinfection of the pens as soon as possible after being used, and before they are again employed for the reception of animals in transit.

Vessels and trucks of any kind used for the conveyance of animals should certainly be cleansed and disinfected after the animals are removed and before other animals are

placed in them. Strictly, this disinfection is only necessary after diseased animals have been conveyed, but it is impossible to prove that diseased animals have not been conveyed; the only safe course in such cases is to assume that they have been, and to proceed accordingly.

Introduction of infected animals from the continent may be placed among the causes which are concerned in the spread of foot-and-mouth disease in this kingdom, but the extent to which this cause has acted has been enormously over-rated. Occasionally infected animals may escape from the landing place to the interior of the country, but considering the short period of incubation of the disease, it is not likely that animals which are sent to us from infected herds or flocks abroad will pass through the time required for transit and the twelve hours' detention, very often prolonged to double the time, without showing some signs of disease sufficient to attract the attention of the inspector; and when the law requires that the whole of a mixed cargo must be slaughtered if any one animal of the cargo is affected with the disease, it cannot be reasonably contended that the regulations for the protection of home-bred stock are in this particular wanting in strictness, or that foreign imports are likely to add seriously to the causes which contribute to the spread of foot-and-mouth complaint in this kingdom.

It has been often suggested that the hardships to which animals are subjected in transit have much to do with the origin and progress of foot-and-mouth complaint. The existence of hardship is undoubted; the influence of such sufferings on the animal's condition cannot be questioned, and it may be admitted that, owing to the privations which are endured, the animal's system may be rendered more susceptible to the action of a specific *contagium*, as it certainly is to the attacks of ordinary diseases; but beyond this nothing can be allowed. No amount of neglect or privation suffices to establish a contagious disease in the system unless the *contagium* is in some way introduced.

(To be continued.)

NOTES ON A REMARKABLE SPECIMEN OF TAPEWORM.

By Charles J. Cullingworth, M.R.C.S., Surgeon to St. Mary's Hospital, Manchester.

A respectable married woman, named Ann H., forty years of age, residing in Salford, brought to my out-patient room at St. Mary's Hospital, Manchester, on September 3, 1873, a few segments of tapeworm as a sample of what she had been passing per anum for about two years. Although never in the habit of taking meat absolutely raw, she told me, on inquiry, that she was particularly fond of tasting it when only partially cooked. The segments were unlike anything I had seen before, and I took them home for examination, ordering the patient meanwhile a draught containing a drachm of the oil of male fern, and giving her strict injunctions to bring to me every fragment that passed away as a result.

On September 17 she brought me portions of a tapeworm corresponding throughout to the segments I had already seen, and measuring altogether nine feet in length. Unfortunately, the head was not to be found. Along the middle line of every segment in the body a crest or ridge runs longitudinally, and in the centre of the margin of this crest the genital pore is situated. [In 304 segments examined, only four had the genital opening placed laterally. One segment had two openings—viz. one at the lateral margin and the other in the crest.] Underneath the segment there is a longitudinal groove, and the lateral portions are folded together by the apposition of their under surfaces. When hardened in spirit, the section of a segment presents a three-branched appearance, the branches being of unequal length, but placed at equal angles. The uterus sends vessels into the crest as well as into the sides of the segment; and the contained ova are exactly like the ova of an ordinary Tænia medio-canellata. Wedged in between, or attached to, the segments here and there, is a stunted and ill-shaped joint, with irregular and unequal sides. A mature joint measures from five eighths of an inch to three quarters of an inch in length, and about half an inch in breadth, and the breadth or depth of the crest is usually one eighth of an inch.

Remarks.—There are only two specimens that I can find on record at all similar to the one here described, and both of these differ from it in several important particulars. Küchenmeister mentions, as a variety of Tænia medio-canellata, a tapeworm sent to him from the Cape of Good Hope

by Dr. Rose. [F. Küchenmeister: "On Animal and Vegetable Parasites of the Human Body." Translated from the second German edition, by E. Lankester (Syd. Soc.), vol. i., Lond., 1857, pp. 139 to 141, and pl. iii., 14 to 16.] This worm possessed a longitudinal ridge, but he describes its mature segments as "extremely massive"—more than an inch in length and 3-5‴ in breadth. The genital pores, too, were irregularly alternate, and not situated on the crest. On March 20, 1866, Dr. Cobbold exhibited to the Pathological Society of London ['Transactions of the Pathological Society of London,' vol. xvii., p. 438] a specimen of crested tapeworm which has been discovered in the museum of Middlesex Hospital, and to which he proposed to give the name Tænia lophsoma (λόφος, crest; σῶμα, body). The reproductive papillæ were all on one side of the chain of segments, a peculiarity which entirely distinguished it from the Cape of Good Hope variety of Küchenmeister. The head of the creature was wanting. It will thus be seen that my specimen does not correspond with either of these in the situation of the genital aperture. Here it is placed in the crest itself, and not unilaterally, as in Dr. Cobbold's specimen, or alternately, as in Küchenmeister's. It further differs from the Cape variety in the more moderate dimensions of its proglottides. I have adopted, however, the name suggested by Dr. Cobbold in the communication referred to, inasmuch as it sufficiently indicates the principal distinguishing feature of the specimen. I may mention, in conclusion, that Dr. Cobbold saw the specimen during his recent visit to Manchester, and that he regards it as a most remarkable and unique abnormality. [From the *Medical Times and Gazette*, December 13, 1873.]

A POISONOUS COMPOSITE PLANT.

Though some of the members of the Composite order are well known for their acrid properties, few, if any, have hitherto been known of an actually poisonous nature. A case, however, is reported from America of the poisoning of some hogs from eating the leaves of *Rudbeckia laciniata*. The genus is a well-known North American one, consisting of herbaceous plants nearly allied to *Helianthus* or the sun-flowers; the receptacle, however, is cone-shaped, not flat as in the sunflower. Several species are known in cultivation. *R. laciniata* is not uncommon in herbaceous borders. It is a smooth,

branching plant, growing to a height of from six to eight feet, the lower leaves are pinnate, and the upper three or five parted. The ray florets are vertical, in a single series, yellow, and the disc florets are tubular, of a greenish-yellow colour. The plant is common in some parts of Canada and the States. The effect upon hogs after eating the leaves of this plant is said to be a kind of delirium, succeeded in a few hours by death. A correspondent, writing from Oregon to the Department of Agriculture at Washington, says—"The hog invariably seeks water, and if he reaches it remains in it until he dies. Vomiting and purging often occur, and are considered favorable symptoms. The discharges are green. Milk and lard are the most effective remedies, and always give relief when the animal is discovered in time. A number of cases were named to me where the hogs had passed into an extreme state of delirium, but were relieved in a few hours by pouring a pint of milk and lard mixed down the throat, and restored to complete health without any other treatment. This plant is very plentiful along the creeks in this county, and is among the earliest in the spring to send forth its leaves, which are eagerly eaten by hogs when turned out. It is also the latest green thing that grows in the fall of the year, and is then eaten by hogs. During the summer months they do not eat it, probably for two reasons—the plants are then tall, and not so tender, and there are many other things for them to eat. The plant is used by some people very early in the spring for 'greens,' but all seem careful to avoid using it except when very tender, as it seems to be the general belief that it is poisonous; indeed, cases have been cited wherein the same results followed the use of it by persons as has been observed in the hog, except that none have been fatal."

CONTAGIOUS DISEASES (NORFOLK REPORT).

At the Quarterly Meeting of the Magistrates of the County of Norfolk, the Central Committee reported that during the three months ending December last there had been 126 declarations of pleuro-pneumonia. 317 cattle had been attacked with the disease, and in addition, three remained affected at the date of the last report; and of these 315 had been slaughtered, while the remaining five had died. There were now 70 premises under declaration of disease. There

had been during the same period 766 cases of sheep scab. The committee believed their arrangements for securing the fair valuation and due slaughter of all cattle affected with pleuro-pneumonia were carried out in an efficient manner. The payment of compensation necessarily entailed a heavy charge upon the county, but at present it was impossible to form any opinion as to the results. A regulation had been made by the committee to insure greater precautions being taken where cattle affected with pleuro-pneumonia were removed for the purpose of slaughter.

Several representations had been made to the committee urging the appointment of additional inspectors on the ground that the districts were too extensive to secure an efficient inspection. The subcommittee have given this subject their careful consideration, and they were of opinion that, as a decided diminution had taken place in the attacks of pleuro-pneumonia (the number of animals in October being 137, while in December they were only 75), it would be desirable to defer any action for a time, as, should the present slaughter regulations reduce the disease to a minimum, the committee believed the present districts would require little, if any, alteration.

The Finance Committee having examined the claims for compensation presented during the past quarter, had allowed the sum of £1313 12s. 9d. in respect of 283 cattle slaughtered in consequence of being affected with pleuro-pneumonia. They had also examined the bills sent in during the quarter, and had allowed the sum of £244 10s. 6d. for inspection. The sum of £8 14s. 2d. for expenses incurred by the police, and £2 3s. 6d. for advertising, were recommended to be paid.

The report was, on the motion of Mr. T. Beevor, adopted.

Mr. Beevor stated that with regard to the order issued by the Court as to the removal of cattle to be slaughtered, Dr. Williams had written a letter stating that the Privy Council did not exactly approve of the regulations. In the opinion of Dr. Williams the removal allowed by the order was in contravention of a section of the Act.

The committee treated that letter with the greatest respect, but they saw no cause to alter the regulations made by the local authority.

INFLUENCE OF THE ADDITION OF FAT TO THE FOOD ON ITS DIGESTIBILITY.

By V. Hofmeister ('Landw. Versuchs-Stationen,' xvi, 347—383).

For these experiments two pairs of one and a half year old South Down wethers were selected, each pair being considered as a single average animal. Each pair received daily 1340 grams of meadow hay, and 670 grams of clover hay, besides common salt and olive oil mixed with the food, in the quantities indicated in the following table, which shows the percentage of the constituents of the food digested during the different periods of the experiments:

Period.	Food.	Pair A.				
		Organic matter.	Albuminoids.	Fat.	Fibre.	Carbohydrates.
I. 13 days.	Hay, and 10 grams salt	54·7	53·1	47·9	57·1	54·0
II. 13 „ .	„ 30 grams oil, and 10 grams salt	54·5	45·1	62·3	51·1	57·7
III. 17 „ .	„ 45 grams oil, and 10 grams salt	56·5	51·4	68·6	52·8	58·3
IV. 17 „ .	„ 60 grams oil, and 10 grams salt	58·1	57·4	77·1	55·1	57·1
V. 14 „ .	„ 60 grams oil, and 20 grams salt	57·0	53·1	79·5	55·7	53·1

Period.	Food.	Pair B.				
		Organic matter.	Albuminoids.	Fat.	Fibre.	Carbohydrates.
I. 13 days.	Hay, and 10 grams salt	57·3	53·9	62·0	53·9	59·6
II. 13 „ .	„ 30 grams oil, and 10 grams salt	62·1	58·2	72·15	59·4	63·5
III. 17 „ .	„ 45 grams oil, and 10 grams salt	60·0	56·0	71·6	57·6	60·75
IV. 17 „ .	„ 60 grams oil, and 10 grams salt	63·0	61·9	74·9	56·75	65·2
V. 14 „ .	„ 60 grams oil, and 20 grams salt	57·1	52·7	75·9	57·6	55·4

The clover used was harvested in August, 1867, and then contained 17·12 per cent. of albuminoïds, but at the commencement of these experiments in March, 1870, they had

declined to 16·03 per cent. The digestibility of clover also decreases by keeping, as shown by previous experiments of the author, in which the digestibility of the constituents fell from the time of cutting in six months as follows:

	Organic matter per cent.	Albuminoids per cent.	Fibre per cent.	Carbohydrates. per cent.
September, 1866 .	68·8	68·4	51·2	73·4
February, 1867 .	58·7	65·0	46·2	63·1

After allowing that 56 per cent. of the albuminoids, 58 of the fibre, and 64 of the carbohydrates of the meadow hay were digested, the calculated percentage digestibility of the clover hay in Period I on the average of both pairs of animals was: organic matter 52·0, albuminoids 50·7, fibre 50·4, and carbohydrate 40·7, showing that its digestibility was much impaired by keeping, owing both to chemical change and to loss of the most tender parts by powdering. G. Kühn (*Landwirth. Versuchs-Stat.*, xii, 371) and Stohman (*Zeitschr. fur Biologie*, vi, pt. 2, 27) have shown that the addition of fat does not increase the digestibility of meadow hay; therefore the increased digestibility shown in these experiments must be due to the clover. Allowing the same digestion as before to the meadow hay, the digestion of the clover with 60 grams of oil, Period IV, which was rather the most favorable experiment, was organic matter 61·2 per cent., albuminoids 63·7, fibre 51·7, and carbohydrates 55·0 per cent. These numbers show a considerable increase on those for Period I, and with the exception of that for carbohydrates, agree well with the average percentage digestibility of clover in Wolff's experiments, viz. organic matter 60·26, albuminoids 61·65, fibre 51·5, and carbohydrates 65·3. Unfortunately no direct experiments were made with this clover. The live weight of the animals altered but slightly during the experiments. The author concludes that the addition of $\frac{3}{4}$ lb. of oil to 18—20 lbs. organic matter in the food, per 1000 lb. live weight of animal, increases the digestibility of the organic matter of clover hay, especially of the albuminoids and soluble carbohydrates, raising them, in the case of old clover hay, to nearly their original standard. The oil added was digested in a high degree. Tha addition of 5 grams of salt per head to the food did not materially alter the digestibility, but 10 grams per head slightly decreased it.—*Journal of the Chemical Society.*

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING OF COUNCIL, HELD JANUARY 7TH, 1874.

MEMBERS PRESENT.—The President, Professors Simonds, Pritchard, and Assistant Professor Axe; Messrs. Balls, Dray, Moon, Withers, Field, Naylor, Moore, Harpley, Woodger, and the Secretary.

The President in the chair.

The minutes of the previous meeting were read and confirmed.

Election of a Member of Council.

It was moved by Mr. Harpley, and seconded by Mr. Balls—"That Mr. John Roalfe Cox, of London, be elected to fill the place of the late Mr. Silvester."

On the ballot being taken Mr. Cox was declared unanimously elected.

Professor Simonds moved, and it was unanimously agreed, that a letter of condolence be sent to Mrs. Silvester.

The Secretary read a letter from Messrs. McGregor and Ross, on the subject of the Sign Manual granted to the New Veterinary College in Edinburgh, and enclosing copy of the Royal Warrant.

A letter was read from John Birkett, Esq., 52, Green Street, Grosvenor Square, acknowledging the honour of his election as a member of the Court of Examiners.

Letters were also read from the various examiners in England making arrangements for the Christmas examinations.

Reports were read of the examinations held in London, Glasgow, and Edinburgh.

The Secretary stated that the certificates from the new Veterinary College in Edinburgh were irregular, inasmuch as they bore date of the 22nd December, instead of the date seven days previous to the examinations as required by the bye-laws.

The Chairman instructed the Secretary to write in order to ascertain under what circumstances the irregularity occurred.

Letters were read from Professor McCall and Dr. Dunsmure, in reference to the examinations held under the old system, and asking the Council to change the date for the examinations.

The Secretary stated that a report had been received of the examinations held in Glasgow and Edinburgh, with receipts and disbursements of accounts enclosed, and asking for cheque for money advanced by Dr. Dunsmure. Also that three letters had

been received from students of the Royal Veterinary College, requesting that they might be allowed to be re-examined under the old system; likewise a petition from fourteen of the students in the new Veterinary College, Edinburgh, requesting to be allowed a general examination in April next, under the old regulations, they having entered the college previous to the passing of the new bye-laws.

The Chairman said that one of the students having passed, only thirteen were eligible under the old system. Of course if this permission were granted it must be applied to all students who might be eligible at that particular time.

Professor Simonds reminded the Council that there were three students asking the same favour from the London School, and he could not see, under the circumstances, how they could separate the one school from the other.

After some conversation,

It was moved by Mr. Moore, and seconded by Mr. Withers—"That the prayer of the Memorial of the Scotch School be granted."

Mr. Dray moved, as an amendment—"That the prayer of the petitioners be not granted, and that the resolution passed at a meeting of the Council on the twenty-third of April last, with reference to the examinations under the old system remain as it is."

Mr. Woodger seconded.

On being put to the meeting the amendment was carried by a majority of ten to two.

A letter was read from Mr. O'Connor, a student in the Clyde Street, Edinburgh, Veterinary College, who was prevented from attending the July examinations, asking permission of the Council to present himself for his final examination in April next.

The Secretary was instructed to write him that the Council was unable to accede to his request.

Fees granted to practical Examiners.

The Secretary, in reporting on the receipts and expenditure, drew attention to the fact that the fees originally proposed to be allowed for the practical examination were twenty-four guineas, but that amount being considered too small to be divided between England and Scotland, it was, at the suggestion of Mr. Hunt and Mr. Cartledge, increased to thirty-six guineas—or twelve guineas for London, and twenty-four for Scotland. During this winter examination in Scotland, five examiners received ten guineas for the practical examination of seven students, whereas, in England, thirty-six

students had been examined for twelve guineas. He thought there should be some regulation or rule with regard to the fees granted.

Mr. Dray gave notice that at the next quarterly meeting he would bring forward a motion relative to the fees to be paid to the practical examiners, and also in reference to the number of examiners to be engaged at each practical examination.

Appointment of Examining Days.

It was arranged that the examinations be commenced on Monday, 30th March, in London, and that the Scotch examinations take place in April.

Library.

Mr. Harpley complained that there were many books published which were not taken advantage of by the members of Council, and produced a list of books which he proposed should be purchased by the Council and placed in the library.

Mr. Moon seconded the resolution, which was carried unanimously.

Mr. Harpley moved—"That a library committee be formed consisting of Assistant-Professor Axe and Mr. Fleming." If the Council saw fit he (Mr. Harpley) would be willing to place his services also at the disposal of the College.

Mr. Dray seconded the motion, which was unanimously carried, and Mr. Harpley's name was added to the Committee.

Mr. Dray gave notice that, at next quarterly meeting, he would propose—"That a record be kept of the attendance of the members of the Council at the meetings, and that it be embodied in the annual report."

Finance Report.

The Secretary read the report of the Finance Committee, and the quarterly balance sheet of the Treasurer's account, from which it appeared that the present liabilities were £115 2*s.* 10½*d.*, which they recommended should be discharged.

It was moved by *Mr. Dray*, and seconded by *Mr. Naylor*—"That the report and the quarterly balance sheet of the Treasurer's account be adopted."

The motion was carried unanimously.

Cheques were ordered to be drawn for the current expenses.

The obituary notice was read.

College Fund Committee.

The report of this Committee showed that thirty-four additional

names had been added to the list of subscribers since the last meeting of the Council, making a total of sixty-two subscribers. The subscriptions up to the present date amount to £716 3*s.* 1*d.*, and several members of the profession had promised to subscribe in the course of the present month.

A letter was read from Messrs. Alexander and J. F. Mavor, presenting £50 towards the College Fund. Messrs. Mavor considered that the object of the fund should be stated, and suggested that a freehold be purchased with the money collected, and that other funds, if required, should be raised on mortgage and paid off by a future generation.

A letter was received from T. W. Mayer, Esq., regretting his inability to attend the meeting, and suggesting that, if suitable premises could be obtained for £2000, a certain sum might be paid down, the property vested in trustees, and the remainder mortgaged for the sum required to complete the purchase in loans of £25 each, two or three to be repaid annually. He also added that he would not vote for a continuance of the present premises for more than twelve months.

The report was unanimously adopted.

In answer to *Mr. Harpley*,

The Treasurer stated the amount which had been received towards the building fund.

Mr. Harpley then proposed—"That the sum of £200 of the College Fund money be placed to the deposit account."

Mr. Dray seconded the motion, which was carried unanimously.

House Committee.

The House Committee reported that a letter dated Nov. 3rd, 1873, had been received from the solicitors, to the effect that at the termination of the three years' lease, at £100 per annum, after Christmas, 1874, they were prepared to grant a renewal on the same terms.

The Committee recommended that the table used for the anatomical examinations be enlarged, as the new examinations necessitated the introduction of the microscope and anatomical specimens. The cost would be £2.

Mr. Dray moved that the report be adopted.

Mr. Withers seconded, and the motion was unanimously carried.

The meeting then adjourned.

ROYAL COLLEGE OF VETERINARY SURGEONS COLLEGE FUND.

(*For the Obtainment of more Suitable Premises.*)

COMMITTEE.—Professor Brown, President; Messrs. Balls, J. C. Broad, James Cowie, William Field, jun., T. W. Gowing, M. J. Harpley, T. W. Mayer.

TREASURER.—Mr. S. H. Withers.

SECRETARY.—Mr. W. H. Coates.

The following List of Subscribers to the Fund for Building or purchasing suitable premises for the offices of the College is complete to the present date, December 26th, 1874.

	£	*s.*	*d.*
Donation originally given by T. W. Mayer, Esq., in 1849	37	14	0
Interest thereon	27	2	6
Adlard, J. E., Esq., London	1	1	0
Axe, J. W., Assist.-Professor, R.V.C., London	2	2	0
Axe, Joseph Machin, Esq., Doncaster	1	1	0
Balls, Messrs. G. and Son, Brixton	21	0	0
Barford, John Davis, Esq., Southampton	2	2	0
Barker, William, Esq., Middlesborough	2	0	0
Bentley, William, Esq., Margate	1	1	0
Broad, James C., Esq., London	10	0	0
Brown, G. T., Professor, R.V.C., London	20	0	0
Brown, John, Esq., London	2	2	0
Burrell, Messrs. T. and Son, London	10	10	0
Carless, Messrs. J. and Son, Stafford	2	0	0
Cartledge, B., Esq., Sheffield	21	0	0
Cartwright and Hill, Messrs., Wolverhampton	50	0	0
Cave, George, Esq., Liverpool	5	5	0
Child, James, Esq., Hackney	5	0	0
Coates, W. H., London	5	0	0
Collins, Jas., Esq., Staff V.S., Dublin	5	5	0
Constant, S. P., Esq., 5th Dragoon Guards, Dundalk	5	5	0
Cooper, William, Esq., Berkhampstead	5	5	0
Cope, Alexander C., Esq., London	5	5	0
Cox, John Roalfe, Esq., London	10	0	0
Death, William, Esq., Army Service Corps, Aldershot	1	1	0
Dray, E. C., Esq., Wandsworth	5	0	0
Farrow, Wm. Hastings, London.	5	0	0
Field, William, Esq., jun., London	100	0	0
Fleming, G., Esq., Royal Engineers, Chatham	5	5	0

	£	s.	d.
Gowing, Messrs. T. W., and Son, London	10	0	0
Greaves, Thomas, Esq., Manchester	20	0	0
Hammond, John, Esq., Bale, Norfolk	1	1	0
Harpley, M. J., Esq., Royal Horse Guards	5	5	0
Harpley, M. J., Esq., *Anonymous*	5	5	0
Hunt and Parker, Messrs., Birmingham	50	0	0
Kent, W. H., Esq., London	5	5	0
Kennedy, Thomas, Esq,, Wrexham	1	0	0
Lawson, Alexander, Esq., Manchester	5	5	0
Lepper, Messrs. H. and G. A. Son, Aylesbury	10	10	0
Longman, Geo., Esq., Cavalry Depôt, Canterbury	2	2	0
Lowe, Clement, Esq., London	2	2	0
Malcolm, John, Esq., Enniscorthy	2	2	0
Mavor, William, Esq., St. Leonard's-on-Sea	10	0	0
Mavor, Messrs. Alexander and F. J., London	50	0	0
Moon, James, Esq., Kingston-on-Thames	5	0	0
Moore, James, Esq., London	5	0	0
Moss, Michael, Esq., Sittingbourne, Kent	1	1	0
Naylor, M. E., Esq., Wakefield	10	0	0
Olver, Thomas, Esq., Truro	1	1	0
Overed, J. D., Esq., Blofield, Norfolk	2	2	0
Owles, Alfred J., Esq., Staff V.S., Aldershot	1	1	0
Pearce, J. H., Esq., Whitchurch, Hants	1	0	0
Peele, Henry, Esq., West Hartlepool	2	2	0
Ritchie, James, Esq., Gateside, Kincaldrum	5	0	0
Robertson, William, Esq., Kelso, Roxburghshire	3	3	0
Roots, William, Esq., London	2	2	0
Simonds, J. B., Professor, Principal R.V.C., London (£10 *for each hundred subscribed*)	30	0	0
Smith, William, Esq., Norwich	5	0	0
South, George, London	5	5	0
Taylor, James, Esq., Colchester	3	3	0
Thomson, George, Esq., Horncastle	1	1	0
Wallis, W. S., Esq., Halstead	2	2	0
Wells, Thomas, Esq., Beacondale, Norwich	1	1	0
Withers, S. H., Esq., London	5	0	0
Withers, Henry, Esq., London	1	0	0
Withers, Alfred, Esq., London	1	0	0
Woodger, Joseph, Esq., London	10	10	0
Woodger, Joseph, Esq., jun.	10	0	0

A gentleman has offered to give £100 towards the fund on condition that nine other members of the profession will subscribe not less than £100 each. Or the same gentleman will give £50, provided that nineteen others will subscribe a sum of not less than £50 each for the same purpose.

NEW MEMBERS OF THE PROFESSION.

At a meeting of the Scotch section of the Court of Examiners of the Royal College of Veterinary Surgeons, held in Glasgow, December 23rd, the following students from the Glasgow College passed their examination and were admitted members of the Body Corporate. One Student from the new Veterinary College, Edinburgh, also passed his examination.

Glasgow Veterinary College.

Mr. George Wyse . . .	East Kilbride, Lanarkshire.
— Andrew Waterston . .	Bunsynd, Street, Ayrshire.
— Robert Paterson . . .	Biggar, Lanarkshire.
— John Crockatt . . .	Dundee.
— Joseph Travis . . .	Manchester.

New Veterinary College, Edinburgh.

Mr. John William Tottie Moore, London.

First Examinations.

At a meeting of the Court of Examiners of the Royal College of Veterinary Surgeons, held in Glasgow, December 23rd, the following Students of the Glasgow College passed their *First Examination:*

Mr. John Thomson,
— Alexander McConnell,
Mr. Robert Archibald,
— Thomas Drummond,
Mr. Duncan Turner.

Also, at a meeting of the Court, held in Edinburgh, December 24th, the following Students of the Edinburgh and New Veterinary Colleges passed their *First Examination:*

Veterinary College, Edinburgh.

Mr. Hugh O'Connor.

New Veterinary College, Edinburgh.

Mr. Michael John Tracey,
Mr. William Joseph O'Sullivan,
Mr. John Mitchell Stewart.

Veterinary Jurisprudence.

NORWICH POLICE COURT.

Foot-and-Mouth Disease.

Jan. 19th, 1874.

A CATTLE DEALER CONVICTED OF SENDING DISEASED ANIMALS TO MARKET.

Sylvanus Wreford, of Northampton, cattle dealer, was summoned for unlawfully exposing for sale in the Norwich Cattle Market on Saturday, Jan. 17th, ten beasts which were affected with the foot-and-mouth disease, contrary to the provisions of the Contagious Diseases (Animals) Act, 1869. The Town Clerk appeared in support of the information, and Mr. Linay defended.

The Town Clerk, in opening the case, said he brought it forward with considerable regret, inasmuch as it was the first instance of disease that had occurred in the county for many months. This being so, he said this was a case which, if proved to the satisfaction of the Bench, called for a severe penalty, in order that such persons as the defendant might be deterred from running the risk of spreading disease throughout the county. He then called the following evidence:

Mr. Wm. Smith, Inspector of the Cattle Market, stated that on Saturday last he saw some cattle on the Hill suffering from the foot-and-mouth disease. He ascertained that they belonged to the defendant, with whom he had some conversation. The defendant told him the cattle had come from Banbury market, and they had also been at Northampton and Lynn markets. Had the defendant used reasonable diligence he must have known that the cattle were so suffering from disease. Some of them were so far advanced in the disease that even a casual observation must have caused suspicions. Witness suggested that he should call in his own veterinary surgeon to examine the animals before they were removed; but he replied, "No; I am quite satisfied with your opinion." There were ten of the animals diseased.

Cross-examined.—There were nineteen animals in all. Of these, nine were not at present suffering from the disease, but some of them had passed through the disease, from which they were recovering. He suspected the cattle to be diseased as soon as he saw them. It was not true that he had passed the pen two hours before without noticing the disease.

Mr. Riches, M.R.C.V.S., also saw the cattle, and stated that nine out of the ten were very bad with the disease. In his judgment any person having a knowledge of cattle must have known they were diseased had he used reasonable diligence. He thought the

disease must have been upon the cattle about twelve or fourteeen days. It must have been apparent to a medical man for seven or eight days.

Mr. Linay made an earnest appeal on defendant's behalf, and said the defendant was ignorant that the cattle were diseased. The defendant had other cattle besides those mentioned, and they were all herded together. Was it likely, he asked, that the defendant would, if he had known it, have herded diseased cattle with others that were healthy? Had the cattle been so badly diseased as Mr. Smith had said, it was hardly credible that a large farmer should have purchased any from the lot, which he would show was a fact. He therefore submitted that a nominal penalty would meet the case.

Joseph Chapman, a drover, stated that he was employed by the defendant. On Tuesday last he was at Lynn with thirty-one beasts belonging to the defendant. One of them was sold at Lynn, and the others were brought to Norwich by rail. They were placed in a field at Norwich on Thursday night, and fed with hay. On Friday morning they were again fed, and appeared to eat their food well. He noticed nothing the matter with them, except that one had something the matter with its "foot." On Saturday morning also they ate their hay very well, and were driven into market. Before Mr. Smith came up eleven of the cattle were sold to a gentleman, who also bid a price for the other nineteen, but defendant would not accept the price bid. He saw nothing to induce him to call his master's attention to the cattle.

Cross examined.—He oiled the feet of the one that was lame and told his master of the circumstance on Friday morning.

After the magistrates had consulted, the *Chairman* said this was a very bad case indeed, and it was very necessary to put a stop to practices such as those which defendant had been guilty of, or a very serious state of affairs might result. He would, therefore, be fined £40 and £3 13s. costs. He was told that he was liable to a penalty of £20 for a single animal affected, and £5 for every one of the ten.

Defendant said it was not likely he should know the beasts were diseased, seeing that they had been passed by the Inspector at Lynn.

Mr. Wells said that perhaps the Inspector at Lynn was not so much upon the alert as the Inspector at Norwich,

Defendant further pleaded that he was a young man and had not had much experience in his business.

Mr. Wells thereupon told him that being in the business he ought to know when an animal was or was not diseased.

On the application of *Mr. Linay,* the defendant was allowed to go to Messrs. Gurneys' Bank in company with an inspector to get the money.

As he was leaving the Court he exclaimed "They give us 'hot coffee' indeed at Norwich."—*Norwich Mercury.*

OBITUARY.

We regret to have to record the death of Mr. Waller Wilkinson, M.R.C.V.S., Newcastle-on-Tyne, at the early age of twenty-five years. His diploma bears date April 22nd, 1868.

Also of Mr. Matthew Small, M.R.C.V.S., Waterford. His diploma bears date November 24th, 1829.

MISCELLANEA.

REFRESHMENT CATTLE TRUCKS.

The Society for the Prevention of Cruelty to Animals offered, some time since, sundry £100 premiums for improved trucks, "to be provided with appointments for the supply of food and water to animals in the carriage during the time when the train is in motion, or when it is stationary at a platform or siding, so as to avoid the necessity of removing the animals from the truck for refreshment;" in competition for which nearly sixty contrivances were sent in. Of these, eight or ten were selected as the most promising by the committee, of whom a final meeting was held on Tuesday, January 20th, when nothing was found to be of a practical character, and no award was made. In fact, the models were generally regarded as too complex, and more like playthings than anything else; the opinion of the committee being in favour of refreshment stations—not necessarily at first-class stations—where the trucks might be shunted for an hour or so, and the animals provided with hay and water, without being unloaded. Amongst the members of the committee present were Colonel Higgins, of Bedford, and Messrs. J. K. Fowler, W. Gatty, Charles Howard, J. Hoyland, A. Hughes, W. Nicks, and R. Warriner.

ERRATA.

Mr. F. Mavor has sent us the following letter with reference to *errata* which occurred in his paper published in our last Number:

Allow me to call your attention to a few clerical errors in my paper. Page 58, experiment at bottom of page, should be "$\frac{1}{24}$ grain aconitine," *not* "atropine;" also should be "respirations" 8 and 5, *not* temperature. Again, page 59, fifth line, should read "considerable loss of volition," and lower down, "respirations" 5, *not* "temperature." On same page, experiment with bichromate of potash, should read respirations "24," *not* "44." As these errors are of very considerable importance, I should feel greatly obliged if you could call attention to them in your next number.

THE

VETERINARIAN.

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Communications and Cases.

A MEMORIAL TO BOURGELAT.

By G. Fleming, Royal Engineers.

The renaissance of Veterinary Science in Europe is about to be commemorated in a manner befitting its importance, by the erection of a monument to Claude Bourgelat, the illustrious founder of those French Veterinary Schools which have done that country so much honour, and conferred such great services not only upon itself, but upon other nations. This is not the first time such an attempt has been made. In 1847, it was proposed that a testimonial of this kind should be subscribed for in France and in those countries which had established Veterinary Schools, but the scheme, through some cause or other, does not appear to have obtained sufficient support. It appears now, however, to be in a fair way to success; and it would be a matter for regret if the profession in this country was not made acquainted with the fact, in order to give it an opportunity of sharing in an undertaking so honourable and so laudable.

The services rendered to Veterinary Science by Bourgelat were great; for in addition to being mainly instrumental in founding the Veterinary Schools of Lyons and Alfort, he was a distinguished Veterinarian, and to his example and teaching we owe that brilliant succession of professors and practitioners who have contributed so much to raise our science to the position it now holds in the principal Kingdoms of Europe.

It is not necessary in this place to give a detailed biographical notice of one so eminent; and it may be sufficient

to mention that, by profession an advocate at Lyons, where he was born in 1712, he entered a corps of musqueteers while still young, and probably struck by the ignorance prevailing with regard to the diseases of horses and their treatment, he appears to have devoted his attention to this subject. Soon after he was appointed director of the riding school of Lyons, and this seems to have given him greater opportunities for studying hippology, and awakening a stronger desire to acquire a knowledge of equine pathology; for he then commenced the study of medicine. When this was completed, he instituted, in 1762, the Lyons school, towards the foundation of which Government gave 50,000 francs, and granted an annual allowance for its maintenance. Under his able direction, this school soon attained a European reputation; and pupils, many of them sent by the respective governments of their countries, from Denmark, Sweden, Prussia, and other Kingdoms, returned accomplished Veterinarians, to found similar national establishments in these Kingdoms. Certainly, the period was favorable for the institution of these and the development of Veterinary science, as Europe had been fearfully visited by successive invasions of cattle plague, and severe outbreaks of disease among horses and other domesticated animals had been very frequent. But that cannot detract from the genius, ability, and foresight of Bourgelat, who was the first to introduce a systematic and regular study of veterinary medicine by means of this school, and who used all his influence, which was very great, in placing the almost new science on a lasting basis. So highly appreciated were the services rendered by the school, that in 1765 the French government founded the splendid college at Alfort, and Bourgelat was chosen director; a position he filled with the highest honour to himself and the greatest advantage to his country. To the example set by France, and the excellent management and teaching of Bourgelat, Austria, Berlin, the German Kingdoms, Spain, Italy, Holland, Switzerland, Denmark, Sweden, and Russia, owe their national schools, nearly all the early teachers in which were trained either at Lyons or Alfort. Even the Royal Veterinary College, established in London towards the end of the last century by an amalgamation of noblemen and gentlemen with the comparative humble Agricultural Society of Odiham, in Hampshire, was indebted for its first professor to the school at Alfort.

To the founder of scientific veterinary medicine, therefore, the veterinary surgeons of every country owe a debt of gratitude, and the acknowledgment of this could not take a more appropriate or durable form than that of a statue. There

can be no doubt, then, that in appealing to the members of the veterinary profession throughout Europe, the committee have done wisely, and with what has been already subscribed and promised, this memorial to one who in reality belongs to us all, is certain to be worthy of the effort,

The appeal is in these terms:—

To honour the memory of our illustrious dead is a patriotic duty. Among the men who have bestowed useful institutions on France, Claude Bourgelat, founder of the veterinary schools and teaching, should be placed in the front rank. The importance of the services he has rendered, and which have been demonstrated by time, should ensure the public recognition of his work. His successors, who continue his labours, have considered that the moment has now arrived to realize the manifestation of this recognition, and to transmit to future generations a monument worthy of him of which it is the object.

A preliminary committee has been formed to raise a statue to Claude Bourgelat. The Beaux Arts administration has kindly presented a block of marble for this statue to the committee, and thus associates itself in an act which has its entire approbation. In order to cover the remainder of the expenses, a subscription is opened, to which are invited all those who, cognisant of the close relationship existing between veterinary, medical, and agricultural science, are conscious of the immense services rendered by Bourgelat.

The statue will be erected in the principal court of the Alfort veterinary school.

This appeal is signed in the name of the committee, by Huzard, Bouley, Reynal, Prudhomme, and Leblanc. Subscriptions (which can be transmitted by post-office order) are received by M. Prudhomme, 60, Rue des Tournelles, Paris.

TUBERCULOUS DEPOSIT ASSOCIATED WITH SPHACELUS OF THE LIVER OF A COW.

By J. Wortley Axe, Assistant Professor in the Royal Veterinary College.

A short time since, I received from Mr. J. C. James, Veterinary Surgeon, Thornbury, Gloucestershire, some interesting specimens of tuberculosis and sphacelitic liver, accompanied with the following history of the case. "The animal

from which the parts sent were removed was a six-year-old pedigree shorthorn cow, which, in August last, was the subject of a severe attack of liver disease, having for several weeks prior to my visit given evidence of ill health. On examination the skin was found to present a yellow aspect, and to be covered to a considerable extent with scaly eruption. The appetite was much impaired, the bowels irregular, the pulse quick and hard; and when the animal was made to move, a long low moan was emitted. Pressure applied over the region of the liver gave considerable pain."

Mr. James added that he considered the case to be one of inflammatory disease of the liver, and that under his treatment the animal gradually became better, and continued in apparent health until the early part of November, when she suffered a relapse. At this time, however, the symptoms were not considered sufficiently urgent for her owners to seek further medical advice.

From the date of this relapse to the time of Mr. James's second visit, which was only a few days prior to the death of the cow, she had continued to waste, and had now become extremely emaciated. The bowels were also much relaxed, the appetite completely gone, and the pulse quick and small; the animal maintaining an almost continuous recumbent position. The application of pressure to the region of the liver gave rise to pain, and over a considerable portion of the upper part of the chest percussion was accompanied with a dull sound, and auscultation detected the existence of a cavernous rhonchus.

Examination after death disclosed the following lesions:— The abdominal cavity contained about ten gallons of straw-coloured fluid; the subperitoneal tissue was studded throughout with deposits of tuberculous matter of various sizes; the liver was much enlarged, and contained several cavities filled with impure pus; the gall-bladder was largely dilated and its coats thinned; it contained upwards of three pints of thick bile, together with several biliary concretions of various sizes. In the substance of the gland two large cysts were found, each containing a piece of dead liver, which was still connected with the walls of the cysts by means of several impervious vessels. These cavities also contained the débris of gland tissue, mingled with a small quantity of thick, tenacious, bile-like fluid.

Small cavities of more recent formation, and filled with puriform tuberculous matter, were present in the lungs; and the supero-posterior part of the right lung was rendered hard and resisting by the deposition of a large quantity of grey-

coloured tuberculous deposit. The uterus contained a fine well-formed fœtus, whose period of gestation was nearly completed. No abnormal deposit was, however, found in any of its viscera, nor were there any signs of other disease in any part of the body.

The parts sent by Mr. James consisted of portions of the diaphragm and inferior abdominal parietes, together with the gall-bladder and two pieces of disorganized liver. The peritoneum investing the first-named structures was more or less thickened throughout by interstitial deposits, and beneath it numerous collections of a dull yellow-coloured material, mingled with masses having a more or less grey and shiny aspect, existed. The former varied in size from that of a hempseed to a pullet's egg. Some of them were soft and fluctuated on pressure, but others were dense and resisting, while the majority gave to the touch an impression both of hardness and roughness.

On section the larger accumulations were found to consist of groups of smaller yellow-coloured tubercles, some being isolated by condensed cellular tissue, and others mingled together in confused masses. A harsh gritty sensation was experienced in cutting into them, owing to the presence of a quantity of cretified material. Here and there, corresponding to the fluctuating masses, small cavities containing a pale yellow, tenacious, pus-like matter were met with; while in other places a yellowish material of cheese-like consistence existed. The accumulations of grey material also varied in size from that of a pin's head to a walnut. The tuberculous deposit appeared to be interspersed throughout the subperitoneal tissue, some of the masses being circumscribed, and others, particularly the larger ones, being more diffused. These were hard to the touch, and on section presented a smooth bright surface of a grey colour, while the gall-bladder was very large, and now contained one small biliary concretion. When filled with water it was found to hold a little over three pints; its walls were thinned, excepting towards the fundus, where slight thickening had taken place. It measured thirteen inches in its long and seven inches in its short diameter, and eighteen inches in circumference at its largest part. Beyond these changes no evidence of disease existed. The two pieces of sphacelitic liver weighed respectively three pounds and a quarter, and one pound and two ounces. They were dark in colour, irregular in form, smooth on the surface, and had a hard elastic touch; on section they presented a smooth unbroken surface, all the vessels being completely impervious. The parenchyma was infiltrated with

inflammatory products, and on microscopic examination the cell-elements of the gland were found to possess a granular-like condition which blended with the infiltrated tissue.

As neither tuberculosis nor sphacelus of the liver can be said to be of common occurrence, either in the human* subject or in domesticated animals, this case possesses a considerable amount of interest, not only from the fact of the two lesions occurring in the same organ at the same time; but also from remote organs being affected with the same morbid productions.

A careful consideration of the whole of the facts relating to this case seems to suggest the existence of tuberculosis prior to Mr. James's first visit to the animal in August last, which had even then led to a considerable deposit in the subserous tissue surrounding the gall-duct, as found by him after death. It is also highly probable that at this time a rapid accumulation of the morbid material took place, which ultimately gave rise to a more or less complete occlusion of the biliary canal, whereby the flow of bile was arrested and the secretion thrown back into the gall-bladder and the ramifications of the hepatic duct, thus inducing acute hepatitis and ultimate sphacelus. This idea receives considerable support from the dilated condition of the gall-bladder and the attenuation of its walls, as well as from the existence in it of a number of biliary concretions, and also from the absence of tuberculous deposits in or about the sloughs.

With reference to the condition of the fœtus of an animal affected with tuberculosis, I do not know that we have any data on which to form an opinion, but, so far as the human subject is concerned, we have the authority of Graetzer,† Kennedy,‡ and others, for saying that tuberculosis, as affecting the fœtus, is by no means infrequent. The subject of tuberculosis is one of great and serious import, not only as affecting our flocks and herds, but also and in a higher degree as affecting ourselves. Every new fact, therefore, bearing upon it becomes a valuable contribution to veterinary science.

* Louis, Rokitanski.
† 'Brit. and For. Med. Review,' 1841.
‡ 'Med.-Chirurg. Trans.,' vol. xxiv.

CASE OF DISEASE OF THE VERTEBRÆ.

By W. Pallin, V.S., 20th Hussars.

Idiopathic spinal diseases are not common in the horse, and the following rare case seems, therefore, to me, to be of special interest, if not instructive to the profession.

A grey troop-horse, six years old, was reported ill at 9 o'clock on the morning of the 18th of January, having commenced to breathe rapidly after a sudden fit of coughing. I considered the case to be one of congestion of the lungs, which was very prevalent just then, as most of the symptoms of this affection were present. The pulse was 60 and full, the respiration difficult and associated with flapping of the nostrils; it numbered 32 on admission of the animal into the hospital. Congestion of the visible mucous membranes was also present.

A diffusible stimulant was at once administered and some ammonia liniment rubbed over both sides of the chest. The medicine was given easily and without coughing; but before the application of the liniment was completed the breathing suddenly became sonorous and difficult, and the horse reared up and fell dead.

The *post-mortem* examination disclosed the following interesting pathological conditions:—On raising the ribs, after having removed the shoulder of the right side, both lungs were found congested, but healthy, with the exception of the anterior edge of the right lung, which was firmly attached to the wall of the thoracic cavity near the second rib. This portion of the lung was connected with a large tumour which almost filled the anterior opening of the chest, having its attachment superiorly to the first, second, and third dorsal vertebræ, and laterally to the first and second ribs. Inferiorly, it enveloped the trachea, which it compressed against the sternum, and from the effects of which the tube was not only bent, but flattened from side to side. The vessels, nerves, and œsophagus passed through the upper part of the tumour, the unattached portion of which was coated by a reflection of the pleura.

The tumour itself was composed of white fibrous tissue mixed with fat, and was of an oval shape. On cutting into its centre a cavity was disclosed which was intersected by bands of strong lymph, and contained about five ounces of fully matured pus. From the upper part of the cavity a number of apertures opened out in the direction of the

vertebræ. The largest of these could be traced to the body of the first dorsal, and formed a kind of fibrous canal into the bone. On tracing the inferior portion of the cavity it was found to communicate with the trachea, into which the matter had found its way by bursting, thus producing death from suffocation. The opening into the trachea, which was between the rings, was sufficiently large to admit the finger; its edges were quite ragged. Along the upper surface of the trachea there was considerable thickening of the muscular structure and congestion of the mucous membrane. This condition was continued to the bronchial tubes, all of which were filled with a thick mixture of mucus and the pus which had escaped from the abscess. The tumour, when removed, weighed three pounds.

The vertebræ, after being cleaned and boiled, presented a splendid example of ossific disease; the whole inferior part of the first dorsal had undergone a complete change. On each side of the inferior spinous process, which was represented by a node of diseased compact tissue, two apertures opened directly into the body of the bone, large enough to admit the little finger, and from each of these numerous smaller canals opened out, all of which probably communicated with the abscess. The bone itself was quite a shell, and weighed one third less than natural. The diseased state did not extend to the spinal canal, but the membrane lining it was thickened, and the spinal column itself was much congested over the part after death. The inferior portion of the second dorsal was diseased, a deposition of bony matter having taken place along its inferior surface. The articulations of the vertebræ were perfectly healthy and the cartilage unchanged.

Remarks.—The horse had been three years in the service, and was only once on the sick list for influenza, a year ago; but he was always of a sluggish disposition, and for a long time had been noticed to go lame at starting with the near fore leg. This lameness, however, passed off after he had gone a hundred yards or so. He had done his work regularly, but the man in charge of him said that his appetite varied day by day. Some days he would refuse his morning feed and appear dull, but an hour after he would eat anything. Naturally he was a gross horse, and up to the time of his death was comparatively fat. He was never noticed to cough.

The disease must have originally commenced in the vertebræ and led to the formation of an abscess, which gradually increased in size and ultimately directed its course towards the trachea as the only means of escape for the pus. It was probably years coming to the fatal climax.

DIFFUSED STRUMA, WITH EXTENSIVE ADHESIVE ATTACHMENTS.

By A. E. Macgillivray, V.S., Banff.

Having recently met with a very interesting case of the above description, I think it well to offer a few remarks on the same in the pages of *The Veterinarian*.

On Thursday, the 5th of February, I was requested to make a post-mortem examination of a cow which had died the day before—twenty-four hours after giving birth to a calf. This cow had been purchased by her present owner some eight weeks before, and I had been consulted about and prescribed for her on two occasions (21st December and 19th January) during that period; and, now that she had died so suddenly, it was thought necessary to make a *post-mortem* examination, to ascertain if there were any signs of disease having existed prior to purchase.

On laying open the abdominal and thoracic cavities I found extensive abnormal attachments of the liver, rumen, and reticulum to the diaphragm, and two or three slighter adhesions of the lungs both to the diaphragm and costal pleuræ, all caused by the irritation produced by strumous disease of an infiltrated or diffused character. There was also a considerable deposit of diffused struma within and upon the muscular tissue of the heart, in the substance of the right kidney, in the brachial and prepectoral lymphatic glands of right side, and on the mesentery. The appearance of the strumous deposits about the auricles of the heart was particularly interesting to me, as I had never before seen diffused struma so extensively affecting that organ, neither had I ever observed it in the substance of the kidneys.

From the extent of the attachments, and the general appearance of the diseased deposits, I gave it as my opinion that the disease had existed for some considerable time prior to the purchase of the cow, and that in consequence she was unsound at that time. Further, I stated that death had been caused by general inflammatory fever, brought on (under the severe trial of calving) through the irritation produced by these strumous deposits. The truth of this was only too evident, for wherever the struma existed there was also an accompanying dark brown congested spot, showing where the inflammation had existed and under what exciting cause it had appeared. These brownish-red, congested, or inflamed spots were most beautifully seen on both auricles

of the heart, being rendered more distinct from the contrast in appearance which they presented to the straw-coloured strumous deposits. The inflamed patches varied in magnitude from the size of a threepenny-piece up to that of a disc several inches in diameter, immense patches being in connection with the upper part of the diseased kidney and around the brachial and prepectoral lymphatic glands of the right side.

It will be seen that I considered the inflammatory patches to be the result of the irritation produced by the strumous deposits, and I find that Professor Walley, in his admirable monograph on "Tuberculosis" (see *The Veterinarian* for September, 1872), confirms this idea by stating that, in his opinion, the patches of inflammation seen in such cases are merely *secondary*.

The cow had not been in a thriving way for several weeks, and no wonder, when almost every organ in her body was the seat of strumous deposit; and more especially, in my opinion, as the disease was of the diffused or infiltrated character, for I have invariably found that this kind of struma is far more given to cause irritation and disturbance than that of the miliary description. How often do we find the carcases and entrails of animals slaughtered in seemingly perfect health literally lined with miliary deposit, and yet without the least inflammatory appearance or of attachments resulting from effusions of lymph. This may be accounted for by the fact that miliary deposits generally restrict their encroaches to the external envelopments of the organs which they attack, such as the pleura costalis, pleura pulmonalis, and serous covering of the liver, &c.; whereas, on the other hand, diffused or infiltrated struma commonly invades the substance or body of the organs on which it may seize, thus causing incomparably more irritation and derangement.

In fact, when, on the occurrence of any extraordinary drain on the system, struma causes death, as it did in the case here recorded, it will be found that a greater or less amount of its diffused phase is present, and has materially aided in bringing on the fatal result.

In cases of diffused or infiltrated struma coming under the notice of inspectors of slaughter-houses, or inspectors of dead meat, I would have the flesh in every instance condemned and destroyed; for, when we find deposits in the substance-proper of the heart, liver, kidneys, and lymphatic glands, it stands to reason that the whole system is involved.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.L.S., &c. &c.

(*Continued from p.* 93.)

Continuing our description of the Berberal alliance, we come next in order to the Berberidaceæ, which occupy the centre of the group.

The Berberidaceæ are well known by the many shrubs with more or less spinous leaves and spines, or abortive leaves, by which many of the species of the so-called Barberry are armed. These are represented in our shrubberies by the Mahonia, Odestema, Berberis, and others; but, perhaps, our best representative will be found in the common *Berberis*, so well known to our hedges. This shrub, so well armed with spines, is a common and not bad kind of hedge-plant, as it is quite hardy, and exceedingly repellant; but there is an objection raised to it on account of its supposed propensity to propagate mildew in wheat.

It is a popular notion that the Barberry is a cause of blight or rust in corn. This has arisen from the circumstance that the Barberry is itself frequently a species of epiphyte (the *Æcidium Berberidis*), in which the leaves appear to be covered with spots of a brightish red colour, whilst wheat is subjected to another epiphyte—the *Uredo rubigo*, or rust. There has, however, been no connection traced between these two, and there can be no doubt that the peculiarity of colour is at the bottom of both the popular errors now described; at all events, with regard to the last, we can point to fields and districts where rust is common on wheat, and yet there is no Barberry near, while in other spots, close under a Barberry hedge, this disease of wheat has scarcely been heard of.

Dr. Syme quotes M. Brussonet to the following effect: This "celebrated French naturalist, who directed his attention particularly to agriculture, assured Sir J. E. Smith that the report of the ill effects caused by the proximity of Barberries to corn fields is, from his own observation, totally void of foundation."*

Our own observations, which have not been few, or hastily made, certainly lead to the same conclusions, though we are not unaware that even recently different views have been expressed. Indeed, we have somewhere seen it stated that

* 'English Botany,' vol. i, p. 73.

wheat watered with an affusion of affected leaves of the Barberry, become affected with mildew, but we should not be surprised if this crop, treated periodically with water alone, would not contract mildew, as it seems brought about by moisture, combined with a peculiar state of the atmosphere.

The berries, which make an agreeable conserve, were formerly held in high repute as a febrifuge, their agreeable acid qualities doubtless tending to make water less repulsive to many people.

But, apart from their acidulous properties, it is likely that their bright scarlet colour more especially recommended these berries in febrile complaints. No less was the bark a favourite remedy for jaundice, as we learn from the 'Treasury of Botany,' that—

"The bark of the Barberry, of which a decoction was made, was formerly much celebrated as a remedy in jaundice, but has long since been discarded from modern practice, as its claims as a medicinal plant only rested upon the doctrine of similitudes, which assumed that nature when she made a plant, impressed upon it some sign to point out its curative properties to those who properly sought such knowledge. In this way it was supposed that as the patient's skin in jaundice is *yellow*, so the *yellow* bark of the Barberry indicated it as a remedy for this diseased condition."*

The VITACEÆ, or Vineworts, must next occupy our attention. This, though a small natural order, is yet remarkable for its number of species, and the endless varieties which are induced by such circumstances as soil, climate, and cultivation; no less also is its most important genus—the *Vitis*—renowned all the world over for its products, which far surpasses in importance those of almost any other plant. Grapes (a comprehensive name), wine, brandy, and vinegar are fluid products of the grape; and dried fruits, such as raisins and currants (Corinths, from the town of that name). These products in endless varieties have been known from a very remote period, and their culture and uses extended to every civilised portion of the globe. Thus, Mr. R. Thompson tells us that—

The cultivation of the vine dates soon after the flood: "Noah began to be a husbandman, and he planted a vineyard." From Asia, according to Humboldt, the vine passed into Greece, and thence into Sicily. It was early carried into France by the Phocœans, when those Ionian colonists fled from the power of Cyrus, and founded the City of Marseilles, about 540 B.C. From Greece or from Sicily it

* 'Treasury of Botany,' vol. i, p. 136.

could have been easily introduced into Italy. The Romans planted it on the banks of the Rhine, and even, it is said, in Britain. But Tacitus mentions, 55 B.C., that our climate was thought unpropitious to the vine, which failed to mature its fruit, owing to the moist atmosphere of our island. It would appear from this that its cultivation has been attempted, for otherwise its failure could not have been stated. The same author states that it was known when Agricola commanded the island. Domitian restricted the cultivation of the vine, wishing rather to encourage that of grain; but in A.D. 278 permission to plant the vine was given to the Emperor Probus. Being free from restriction, its cultivation throughout the Provinces, including Britain, would of course extend, and before the Roman power had so far declined as to permit the Saxon invasion, vineyards must have existed in this country. They are mentioned in the earliest Saxon charters, and those vineyards must have existed previously; as authors have remarked, the combating invaders could neither have had the time, nor probably the skill to plant them. The monks in A.D. 1140 planted a vineyard at Edmondsbury, in Suffolk, and William of Malmsbury says that vineyards were possessed by barons as well as by monks. Winton, afterwards named by the Saxons Winchester, or the City of Wine, was so called because there was the best vintage in Britain.*

Even in that cold and elevated district of Gloucestershire known as the Cotteswold Hills we find a place called the "Vineyards," and the remains of some walled-up slopes facing the sunny south probably point to the site of the vineyard.

We have tried the growth of the vine on warm slopes so situated, but without success, our difficulty being not to grow the plants most luxuriously, but to get flowering buds. These, it would appear, require warmth to determine, on the principle of arrested development, whether the opposite bud shall form a twig, a bunch of grapes, or a tendril—matters which we can regulate in our hothouse, but not in our variable out-of-door climate, to say nothing of the usually cold nights of early summer in this country.

Grapes, then, as a fruit, are grown with us for the most part in hothouses or greenhouses, and perhaps nowhere is this delicious fruit brought to greater perfection than with us. The fresh fruit is highly extolled in febrile complaints, and Sir J. Clark observes that "the subjects of pulmonary affections, who pass the summer in Switzerland, may try the effects of a

* See 'The Treasury of Botany,' article "Vitis."

course of grapes—'*cure de raisin*'—a remedy in high estimation in several parts of the continent."

Dried grapes are much esteemed, both at the dessert and in those thoroughly British compounds, plum puddings and mince pies. These are really very nice, and highly esteemed by young and old, but the latter should be aware that these comestibles are very indigestible, and though in youth it may be taken even cold with impunity, yet a *soupçon* of the essence of the vine in the shape of brandy is recommended to those of weak digestive organs. But it is the juice of the grape in its various forms and different products that has been so justly celebrated. "*Wine*, that maketh glad the heart of man," is grape-juice subjected to vinous fermentation producing a varied proportion of alcohol, which, indeed, when small in quantity, renders a "light wine," but when in larger proportions it gets the name of generous wine. Some, too, will be dark, others light-coloured, giving rise to the terms "red and white" as applied to wines.

Besides alcohol as a stimulating principle, there is reason to believe that "flavour and bouquet," so much admired in some varieties, are due to a peculiar kind of ether. There is reason to think that wines are too much adulterated for them to be appreciated for anything but their power of intoxicating; this is done by alcohol in some form or another, by which wine is said to be "fortified." Many of the frauds have got wine into disrepute; thus those who are too fond of strong wines drink them to intoxication, but the true connoisseur looks more to bouquet and flavour than to alcoholic strength; and, indeed, the ethers upon which the latter depend seem to possess an invigorating property, as champagne has stimulant effects far beyond that which its alcohol would warrant.

From the peculiar circumstances attendant upon mere drinking, mankind seems divided into two sections upon its merits; thus one portion of the world would denounce it as poison, while another raises it almost to the dignity of a deity, and sings songs loudly, alas, too much so sometimes, in honour of the "Rosy God—Wine." As a stimulant, wine and brandy cannot be excelled; it is largely used as a dietetic medicine, and alcohol is much employed in pharmacy in the distillation of spirits, as in sal volatile and spirits of ether. It is still more used in tinctures as a medium to dissolve and extract active vegetable principles.

Wine, as such, has scarcely a place in the pharmacopœias, but we have known a bottle of port to be administered to a

too much overdone hunter with as good an effect as to his master, and our own experience has taught us that frequently a good glass of wine has acted like a charm, a fact now so generally recognised that the large and increased consumption of wine and spirits within the last few years is to a great extent due to their use to fortify the system against many violent attacks, which at one time were subdued, too often by killing the patient, with depletive measures. Nor must it be concluded that this practice is confined to the rich, as large Poor Law Unions expend hundreds annually in providing vinous remedies prescribed by the doctor.

"*Brandy, eau-de-vie*, Spiritus Vini Gallici," says Pareira, "is an ardent spirit obtained by distillation of wine. Its properties are subject to some variations arising from the different growths of the vine; the brandies of Languedoc, Bordeaux, Armagnac, Cognac, Aunis, Saintonge, Rochelle, Orleans, Barcelona, Naples, &c., being each recognisable by an experienced dealer. The most celebrated French brandies are those of Cognac and Armagnac." Brandy is pale coloured, but being coloured (principally with caromel) is dark.

It remains now to notice vinegar as a product of the grape. The *Acetum Gallicum*, or French vinegar, is obtained from different inferior wines, a dark from red, and light, or white-wine vinegar, from "white" wine; it is produced by allowing the juice of the grape to go on to acetous fermentation. Vinegar is obtained from various sources; its use in making pickles, as a condiment, &c., is well known. Tuson says of its "ACTIONS AND USES—*Internally*.—Refrigerant to allay febrile heat; styptic, astringent, and diuretic, also lithonlytic for calculi and urinary deposits, consisting of calcium or magnesium phosphate, or carbonate. Likewise employed as an antidote to poisoning by alkalies and their carbonates. Very seldom used, however, internally."*

We have seen then that the products of the vine have exerted considerable influence on the present status of mankind, and we would fain hope that an extended use of good wholesome wine may banish the prevailing over-indulgence in ardent spirits.

* 'Veterinary Pharmacopœia,' p. 2.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of January, 1874, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign ports from which brought.	Ports in Great Britain to which brought.	Disease.	NUMBER OF ANIMALS AFFECTED.					DISPOSAL.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Geeste-munde .	Newcastle-on-Tyne	Sheep-Scab .	...	65	...	...	65	65
Honfleur .	Southamp-ton . .	Foot-and-Mouth	3	...	...	...	3	3
Oporto . .	Liverpool .	„	31	...	...	...	31	31
Total . . .		Foot-and-Mouth	34	...	...	...	34	34
		Sheep-Scab .	...	65	...	...	65	65
Total.			34	65	...	...	99	99

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 12th February, 1874."

CATTLE PLAGUE.

ADVICES from Bucharest state that this disease is exceedingly prevalent in the district of Roumania; that the rate of deaths is about 60 per cent. of those which are attacked. Cattle plague has now disappeared in Hungary proper, but continues very prevalent in Slavonia, Croatia, and the Military frontier. Outbreaks of cattle plague are announced

from Vienna in the districts of Stanislau, Kalezcyki, Rohatyn, and Borszezovo, in Galicia; and in Lower Austria; Upper Austria; Styria, and Carniola.

At Bosnia Servi the disease has nearly disappeared.

Around Salonica the cattle plague is still raging in the provinces, carrying off large numbers of animals.

The disease is also spreading in Poland in the neighbourhood of Petrikaw and Warsaw, where it exists in five different localities.

FOOT-AND-MOUTH DISEASE.

Foot-and-mouth disease continues to increase, as shown by the number of cases in the Metropolitan Market and in the lairs. Periodical accession and decline in the severity of the disease are characteristic of it, and not easily accounted for.

During the whole of last summer the affection decreased, and at the time which is generally distinguished as the period of its greatest prevalence—the autumn—it had nearly ceased. The attacks were few, and the malady did not spread. Suddenly at the end of the year it reappeared in several localities far distant from each other, and since then it has gradually increased up to the present.

Facts and Observations.

Ranvier on Red and Pale Muscles of the Rabbit and Ray.—Ranvier (*Comptes Rendus*, vol. lxxvii) says that it is well known that certain animals have two kinds of muscle, the red and the pale. In the rabbit the semitendinosus is red, whilst the vastus internus in which it is lodged is pale. Again, the adductors of the thigh contain both pale and red fibres. The difference of colour does not depend upon the quantity of blood in the capillaries. In the rays and torpedoes there are muscles formed of two kinds of fibre. The semitendinosus of a rabbit, stimulated by an interrupted current, contracts gradually and progressively. When tetanised, it remains contracted as long as the irritation is continued. On cessation of the irritation the muscle gradually returns to its original length. The pale muscles of the rabbit, stimulated by the same current, contract abruptly, and, after cessation of the irritation, return also

abruptly to their original length. The curve of such muscles consists of a series of zig-zags corresponding to the interruptions, while that of a red muscle, excited by the same current, yields a continuous wave which attains a certain height, corresponding to the tetanic contraction, which remains while the irritation is kept up. After cessation of the irritation the curve gradually sinks. The red muscles lose their excitability sooner than the pale.

The rays, besides the red muscles, have a few pale fibres under the dorsal skin. Each of these kinds of muscle manifests the same phenomena, when electrically stimulated, as the corresponding muscles of the rabbit.

The muscular fibres, pale and red, in the rabbit have the same diameter—0·040 millimètre to 0·060 millimètre. In the pale muscles the transverse striation is very distinct, whilst the longitudinal is scarcely visible. In the red, on the contrary, the longitudinal striation is very distinct, whilst the transverse striæ, instead of being rectangular as in the pale, form broken lines. In carmine-stained preparations the nuclei of the red muscles are much more abundant than those of the pale.

In the rays the red fibres are 0·060 to 0·090 millimètre in diameter, whilst the pale ones are 0·150 to 0·180 millimètre. They present the same difference in structure as in the rabbit. In the rays, torpedoes, and some other fishes, the sarcolemma, instead of being applied directly to the mass constituting the primitive bundle, is separated from it, and the interval is occupied by a material studded with fine granulations. Nuclei are scattered equally in the thickness of the primitive bundle.—*London Medical Record.*

How different Agents affect the Secretion of Bile.—Dr. Stricker has recently made some experiments on this subject which are decidedly of interest. In a paper read before the Gesellschaf der Aerzte, the defects of the former methods of obtaining the secretion were pointed out, and a new method suggested by which a canula was introduced into the ductus communis choledochus; from this depended a flexible caoutchouc tube, which ended in a mouthpiece that was kept constantly at the same level in a vice, thus avoiding apparent variation due to different heights of the orifice of exit. These experiments showed that all circumstances causing hyperæmia of the blood-vessels of the liver increased the secretion of bile; whilst, on the contrary, all circumstances producing anæmia caused diminution. Thus, the secretion was arrested in fasting animals, whilst it

augmented after food. Water introduced into the stomach or intestines caused a slight but transient increase. The introduction of purgative medicines, as croton oil, colocynth, jalap, calomel, Epsom salts, &c., materially increased the secretion of bile. It was at once stopped by ligature of the vena portæ and vena hepatica. Ligature of the hepatic vein alone materially diminished the secretion; ligature of the aorta at the diaphragm materially diminished the secretion, but did not entirely stop it; ligature below the origin of the cœliac artery augmented it; ligature of the vena cava ascendens immediately caused stoppage of the biliary secretion. All circumstances causing contraction of the vessels diminished the amount of secretion, as, for example, irritation of an exposed nerve, division of the spinal cord just below the medulla oblongata, and injection of strychnia.—*Popular Science Review.*

The Mode in which Bacteria Multiply.—Herr Grimm, in the *Archiv fur mikrosc. Anatomie*, describes the reproduction of Bacteria and Vibriones from his own investigations. He has observed their conjugation and fissiparous multiplication, and also has seen leucocytes breaking up into granular matter, which ultimately assumed the form of Bacteria.—*Ibid.*

Digestibility of the Fat of Hay. By E. Schulze (*Landw. Versuchs-Stationen*, xvi, 329—335).—The author gives a list of the results of different experimenters on the digestibility of the fat of hay, showing that the digestibility differs much in different hays, and also in the same hay in different experiments; with sheep it ranges from 8·5 to 60 per cent. The percentage of the ether extract soluble in cold alcohol, from different samples of hay, does not vary to any great extent, being about 70 in the experiments of both König and Schulze. This would indicate that a part of the fat soluble in cold alcohol, and also of the insoluble portion, is digested, though, as shown by König's analyses of the fat in the excrements, those substances which contain least carbon are in both cases most easily digested. It is also probable that the difference in the progress of digestion in different experiments has more influence on the ether extract than on the other constituents of the food. No satisfactory results on the assimilation of the fat can be expected except by direct experiments.—*Journal of the Chemical Society.*

THE VETERINARIAN, MARCH 2, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

RABIES AND HYDROPHOBIA.

RECENTLY several very painful cases of hydrophobia have come under our notice, and, concurrently, our attention has been drawn to the spread of rabies in the metropolis especially. Rabid dogs have been brought to the College by their owners, who sometimes were only inclined to suspect the nature of the disease from which the animals suffered; and in other cases no suspicion was aroused. Comments on the subject have appeared in the medical and daily press; but, notwithstanding that the facts are admitted and deplored, there are no suggestions for the prevention of the disease.

Difficulties of no ordinary character oppose the efforts of the sanitary reformer where dogs are concerned. The slightest hint at the necessity for restricting the playful creatures' freedom of movement elicit a complaining howl from a large class of "sentimentalists who delight in dribbling out platitudes about the faithful friend and companion" of man. Of course people who really want dogs for work of some sort have them under control, and know when anything goes wrong. Even the toy dogs are too affectionately tended to do much damage in the direction of propagating the disease if they became rabid; and considering that they are seldom allowed their freedom, they incur little risk of being inoculated with the virus. But the greatest amount of harm is done by the hundreds of homeless, straying, starving animals which infest the streets, cared for by nobody, hardly noticed at all, unless the pangs of hunger cause them to become aggressive, when they get a ready greeting from a drover's stick, or butcher's knife cast at them in vain effort to compel them to give up their plunder.

General indifference on the part of the public allows the useless, homeless, starving dogs to live to everybody's inconvenience including their own. A feeling of sickly sentimentality prompts the few to yell with horror at the suggestion to shoot or otherwise summarily dispose of creatures which are essentially profitless, and may be dangerous.

Dogs, unfortunately, have the faculty of adapting themselves to a wandering life unlike the other domesticated animals cats, which insist on inhabiting our houses; consequently, while we are perforce led to limit the multiplication of the feline race, we leave the canine to expand itself without restriction other than that which exists in the unfavorable condition of existence, to wit, mainly the want of food—a state of things which conduces to the "survival of the fittest," that is to say, of the most actively predatory.

Evidently it is time that something should be done,—the provisions of the Dogs' Act are quite inadequate to meet the necessities of the case. The first thing, perhaps, is to educate public opinion, for without the active concurrence of society it would be impossible to enforce any effectual provisions for the prevention of the most frightful malady to which human beings are liable.

Reviews.

Quid sit pulchrum, quid turpe, quid utile, quid non.—Hor.

Veterinary Medicines: their Actions and Uses. By Finlay Dun. Fourth Edition. 1874.

The fact that Dun's 'Veterinary Medicines' has, in the course of a very few years, arrived at a fourth edition, is the best proof that it is a work of considerable merit, and that it is highly appreciated by the profession.

The book opens with an account of the physiological and therapeutical actions of medicines; several pages are next devoted to pharmacy, and the remainder, which forms by far the greater portion of the work, treats of the sources, modes

of preparation, uses, &c., of the medicinal agents used in veterinary practice.

Regarded as a whole, the book is exceedingly well written, and we consider that the author deserves especial credit for the able manner in which he keeps his readers abreast of the latest investigations in therapeutical science, as may be seen by his references to the researches of Lister on the 'Antiseptic Treatment of Disease,' Harley and Mavor on 'Belladonna,' Sansom on 'Sulpho-carbolates,' as well as to many other inquiries of equal interest and importance. Another valuable feature of the book is that, in the descriptions of agents whose physiological action or therapeutical effect is doubtful, or about the efficacy of which there is a division of opinion, voluminous records are given of cases in which such medicines have been tried, together with the results which have followed the experiments.

The better we become acquainted with the book the more highly we regard it, and the deeper is our regret that the other departments of British veterinary literature are not as well represented as those selected by Mr. Dun.

In future editions, however, we hope that greater care will be bestowed upon the revision of the chemical formulæ employed; the errors in this direction are so many that we fear they will confuse students using this as a text-book while attending a systematic course of chemical instruction. For instance, at p. 124, ether is written C_2H_5O, instead of $(C_2H_5)_2O$, acetic ether C_2H_5A instead of $C_2H_5\bar{A}$; at p. 207, calcium phosphate $CaH_4\,2\,PO_4$, instead of $Ca_3(PO_4)_2$; at p. 359, $PbSO_4$ instead of PbS; at p. 457, commas are used in an equation, where they should be omitted, and the sign + is absent where it should have been introduced. We must also direct the author's attention to his habit of spacing symbols in a very great many of the formulæ. Thus, at p. 243 chloral is written $C_2\,HCl_3\,O$. Spaced formulæ of this kind should not be employed, as their use is not warranted by custom; moreover, the closer approximation of the HCl_3 than of the other symbols is calculated to excite erroneous impressions regarding the constitution of the compounds in the mind of the tyro by whom the work may be read.

Notwithstanding these defects we can recommend Mr. Dun's work as one which should not only be possessed, but carefully studied, by every practitioner and student of veterinary medicine.

A Pharmacopœia, including the Outlines of Materia Medica, for the use of Practitioners and Students of Veterinary Medicine. By RICHARD V. TUSON, F.C.S., Professor of Chemistry, Materia Medica, and Toxicology at the Royal Veterinary College. Second Edition: 1874.

As the author of the 'Veterinary Pharmacopœia' is one of the Editors of this Journal we cannot consistently subject the work to the ordinary process of review; but must content ourselves with little more than an announcement of the publication of a second edition. We may state, however, that such was the favorable reception accorded to the first edition of this handy volume, that it was exhausted in about eighteen months. The second edition is larger than the original by about thirty pages, and the few errors which appear to be inevitable in all first editions have been carefully corrected.

We have no doubt that the present issue will receive a repetition of the praise that was bestowed upon the previous edition by independent reviewers in other journals.

The Veterinarian's Pocket Conspectus of Medicinal Agents, and Poisonous and Medicinal Plants; with Doses, Symptoms of Poisoning, Antidotes, &c. By THOMAS WALLEY, M.R.C.V.S., Professor of Cattle Pathology in the Veterinary College, Edinburgh. 1873.

THIS may be described as a pocket volume of sixty pages, which, for the convenience of appending notes, is interleaved. It is not a work to be studied in the ordinary sense, as nearly all the information it contains is conveyed in abbreviations or symbols; but as an aid to the memory in emergencies, when more complete works are not at hand, it will render good service. The references to the habitats and natural orders of poisonous plants, and the information as to whether or not they are natives of Great Britain, constitute a feature which adds greatly to the practical value of Mr. Walley's book, and which will be fully appreciated by veterinary surgeons carrying on their professional duties in the country.

Extracts from British and Foreign Journals.

PARASITES, AND THE PART THEY PLAY IN THE ECONOMY OF NATURE.

By T. Spencer Cobbold, Esq., M.D., F.R.S.,
Professor in the Royal Veterinary College.

Abstract of a Lecture, delivered in the Memorial Hall, Manchester, on Wednesday, November 12th, 1873.

Lest the subject of my discourse should have alarmed some of my hearers, who may not unnaturally entertain a horror of parasites and parasitism, I wish to remark at the outset that the study of these creatures is of the highest interest, and really quite attractive. The subject is attractive because it is full of novelty; yet more attractive because it opens up to our view some of the strangest biological phenomena of which the human mind can take cognisance; and most attractive because a knowledge of it brings with it a rich practical reward, enabling us to do effectual battle with some of the many ills of life to which our human flesh is heir.

I would have you observe that, in order to acquire a satisfactory knowledge of this subject, you must approach it in a right frame of mind; this being a matter of personal and moral discipline. The discipline consists in a vigorous determination on the part of the student to dispossess his mind of all preconceived opinions whatsoever, and in an attitude of child-like simplicity to seek truth only for truth's sake. Those people who with nervous anxiety are for ever seeking to reconcile the conclusions of modern science with the ideas of their forefathers are likely to remain just as ignorant of the true value and significance of Nature's teachings as all their fathers were. The mind must be absolutely unfettered and free if it would comprehend the facts of this or any other department of science.

Let us endeavour, first of all, to acquire a large, healthy, and rational grasp of the *general*, in contradistinction to the *special*, facts of parasitism. You are aware, doubtless, that we are in the habit of speaking of the plants of any given territory as constituting the "Flora" of that territory. In like manner, also, we are in the habit of speaking of the animals occupying any territory as constituting the "Fauna" of that territory. Thus we have a British Flora and a British Fauna. We have, likewise, insular Floras, continental Floras, and so forth.

Now, if you would entertain an adequate conception of the

relations subsisting between the parasites and their bearers—that is, the creatures in which they dwell—you must look upon each individual bearer of the parasites as forming a territory, or an area in which these creatures legitimately take up their abode. This abode is assigned to them for the purposes of their existence; and constitutes, therefore, in the manner I have sought to explain, the Fauna of that territory. The human territory is occupied by internal parasitic inhabitants, which might, if they could speak, claim as much right to occupy that territory as you and I claim to occupy British territory. There is also an external group, or parasitic Fauna; but of the animals comprising it I do not now propose to speak. We have, in like manner, canine, bovine, and ovine territories; or, in plain English, various species of internal parasites or entozoa infesting the dog, the ox, and the sheep. So, also, you notice that we have in the series of internal parasites infesting the horse what may be called the equine parasitic fauna.

Confining our attention to the internal parasites, we call them technically the *Entozoa*. The student of parasites recognises four principal kinds of creatures which reside in these various territories. They are named respectively, first, the *Cestoidea*, which means tape-worms; secondly, the *Trematoda*, which means fluke-worms; thirdly, *Acanthocephala*, which means thorn-headed worms; and, fourthly, *Nematoidea*, which means thread-worms. I must in the next place explain to you that these are totally distinct classes of parasites; though all four of them possess one character in common, namely, that they reside inside their bearers and not outside. They are, therefore, as before remarked, called *Entozoa*, in contradistinction to the external species which are technically known as the *Ectozoa*.

The *Trematoda* derive their name from a Greek word meaning "perforated." The group, termed *Acanthocephala*, is represented by the parasite termed *Echinorhynchus*. It is a singular-looking creature. It has a large head, narrow neck, and thick body. Its large head is covered all over with hooks. The species here figured is one that lives inside the whale. Several allied species dwell in other cetaceans. There is one of our domesticated animals which also has the privilege of harbouring a species of *Echinorhynchus*. The animal to which I allude is the hog. Neither ourselves, nor the horse, ass, ox, sheep, goat, dog, or cat, are liable to have the privilege of entertaining this singular acanthocephalous guest.

The expression "territory" is so long a word that we often find it more convenient to call the bearer of the parasite the "host;" the parasites themselves being the "guests." We shall in future generally adopt these shorter terms. If a person is

invaded by a parasite he is said to be the host, because he entertains the guest. Of course the guest is usually an unwelcome one; however, I have known guests of this description cultivated or farmed in the human territory or host. For example, when I was, some years back, performing a number of practical researches, I required a large quantity of parasites to experiment with; and one human host was kind enough to rear an immense number of these creatures in his own territory for my especial advantage. I gave him a fee whenever he brought me a bottle full. I will now explain more clearly the nature of the three groups, respectively termed *Trematodes*, *Nematodes*, and *Cestodes*. You must have some general notion of what a fluke consists before we enter into details. Here is a series of drawings placed before you, collectively representing many different kinds of flukes.

I daresay you would wish to know the meaning of the term "fluke." It is an old word, which signifies anything flat. When a person speaks of a "fluke" at billiards he means that the stroke was a stupid one, or that of a "stupe" or "flat." The North Sea sailors call the divisions of the tail of the whale "flukes;" and when the great whale takes a plunge downwards, up goes the tail, and the sailors then shout out, I'm told, in not very good grammar, "There goes Flukes." These parasites are called flukes, therefore, merely because their bodies are flat. You will probably recognise in this drawing the common fluke, which abounds in cattle and sheep, and gives rise to the formidable disease vulgarly called the "rot." Hundreds and thousands of sheep sometimes perish in a single year on account of the occurrence of the rot epidemic, and this disorder is entirely due to the prevalence of the parasite in question, which takes up its abode in the liver of the ovine host. Here is a series of other flukes. You will see that after all they are not very horrible-looking creatures. They resemble so many unrolled and extended leaves. Their beautiful downward-branching organs are connected with the digestive system of the animal, forming, in fact, a complex kind of stomachs; and there are other sets of branching organs which form a system of water vessels, containing a fluid of a peculiar character. This species (*Fasciola hepatica*) is from the common sheep; but occasionally the human host is permitted to have the privilege of entertaining this parasite, for it has been found in the human subject in eighteen separate instances. It is, therefore, an extremely rare human parasite. You need not alarm yourselves about this worm. Don't fancy when you are enjoying your mutton that you run any chance of infecting yourselves with this entozoon—nothing of the sort, I assure you. You are perfectly safe.

Here is another still more remarkable fluke, which fortunately does not exist indigenously in this country. It is called the *Bilharzia*, a name which I gave it in honour of its original discoverer, Dr. Bilharz—a physician practising at Cairo. It gives rise to a most terrible disorder in the human subject. Hundreds of thousands of the eggs of these parasites are sometimes found escaping from the body of a single person. The creature is a true fluke, but it is not so flat as flukes in general; and, moreover, the sexes are separate. It has, you see, a round body, with a sucker at the anterior extremity.

Here is a little fluke (*Distoma lanceolatum*), from cattle, and about half an inch long; and here is another pretty little fluke, called the *Polystoma*, which resides in the frog. Put it on a slide under the microscope, and you would exclaim, "What a charming creature." It is an exquisite object, only about one fourth of an inch long. The frog is a host that is liable to entertain a considerable series of guests. Here is a fluke from the hedgehog, and beside it is another one from the fox (*Brachylæmus* and *Monostoma*). Here also is one that I had the good fortune to discover between twenty and thirty years ago, in a giraffe, *Fasciola gigantea*. You will notice a general family resemblance between this fluke and that of the sheep. So much for flukes.

We will now examine a few of the round worms and thread-worms. The creatures first figured here are *Trichinæ*. You have heard a good deal about the flesh-worm called *Trichĭna spiralis;* some persons pronounce it *Trichīna*, but it is more correct to give the second vowel short, in accordance with the Greek root. Here is one of the *Nematoidea*, called the *Trichocephalus*, or round or whip-worm, because it is shaped like a whip. Here are others more resembling common earth-worms, but they have no sort of relation structurally to those inhabitants of the soil. "Worms" form a most unfortunate and improper collective name for these parasitic creatures; but I suppose we must retain the barbarous nomenclature, as a concession to time-honoured ignorance.

There is one more group, namely, the *Cestoidea*, or tape-worms. Here we have a truly singular series of creatures. Most people have heard of such worms, but comparatively few have seen any. There is one figured which is called *Tænia mediocanellata*. It is the tape-worm which the human host obtains when he eats underdone beef. It is the most common form of human tape-worm. It is quite a delusion to think that the pork tape-worm is as common as that derived from beef. I can speak quite confidently on this point, because I have investigated the subject very carefully. It has four suckers, but no hooks. That one

from pork is recognised by its head having a series of hooks in addition to four suckers (*Tænia solium*). The tape-worm is a most remarkable creature. It consists of a head and a segmented body, which is sometimes twenty feet long or more. Each one of its joints or segments is what Professor Huxley would term a *zooid*. It is a sort of semi-independent individual. In fact, a tape-worm is not a single creature, but a multitude of creatures all arranged together in single file. You probably have some acquaintance with those pretty little objects which are found on the sea-shore—zoophites, or polyps, with numerous heads. Now the compound polyp is a colony of individuals branching out like a tree. But here is a colony of polyps ranged in single file like a regiment of soldiers; and thus one long creature is produced by a number of little beings adhering together. Some 1200 individuals are here joined together so as to form a colony. The marvellous changes through which the tape-worm passes I have not now time to dwell upon. My present object has been to give you a clear and definite idea respecting the nature of the three principal groups of guests that have the privilege of residing in the human and other hosts.

I now pause to ask you a cogent question. In the face of the data I have laid before you, can you, I ask, be satisfied with the old and erroneous notion that these parasites are merely the results of disease? Or, again, can you be satisfied with that merely modified conception which would make it appear that these creatures only exist in hosts previously enfeebled by disease? Is it not already palpable to you that such popular notions as these are utterly unworthy of your regard; that they are altogether out of harmony with other conclusions of a like kind deduced from scientific observation? If you have a whole series of organised beings taking up their residence in territories (granted that they are peculiar territories), each one of which is furnished with organs enabling it to occupy that territory to its own advantage, how is it possible, I say, to be satisfied with those old teachings which assert that all these wonderfully organised creatures are the mere result of disease? Some persons, indeed, have been foolishly persuaded to look upon these parasites as so many tokens of Divine chastisement! Such an interpretation of natural phenomena is unscientific. Here, you observe, is a series of natural areas; these areas being respectively occupied by highly organised creatures, each of which is fitted, most wonderfully, to take up its singular and suitable abode. I speak earnestly on this subject, because I am most desirous (as one who has worked at the subject for many years) that healthy, rational, and true views should be taken up in this connection, and that the old ones should be abolished. You must pardon

my freedom if I appear unduly anxious on this point. I entreat you to be guided only by the teachings of reason as opposed to the dogmas of a carefully nurtured and educated ignorance. Whether you deal with subjects of this kind, or whether you are working out at those other departments of science which are justly considered far more delightful—the charms of the study of spectrum-analysis must be great for those who pursue them—there are, you may be sure, great lessons to be learnt. Even in the investigation of these little despised parasites there are teachings to be got at which are in harmony with those resulting from more attractive pursuits.

Well, now, to pass on to the special part of my subject, let me give you a few details respecting the life-history of one or two forms. Perhaps I cannot do better than say something about one I have alluded to already, namely, the little flesh-worm (*Trichina spiralis*). I hold in my hand a simple microscopic slide, and if this small specimen were placed under a microscope, you would observe 100 parasites at least. Now supposing any human individual were infested with this parasite to the extent represented by this little specimen, you might state without exaggeration that he entertained fifty million guests! In some instances more have been harboured by a single host. I happen to have examined part of the flesh of an unfortunate foreigner, who was killed in the streets of London, and who must, during life, have entertained a hundred million of these guests. If you examine a portion of trichinised flesh under the microscope, or even with a pocket lens, you will often notice numerous little capsules that are lemon-shaped or, it may be, spindle-shaped. In each one of these capsules is rolled up a little flesh worm; so that if you take one and magnify it still more highly, you will see the worm quite distinctly.

I now show you a representation of eight lemon-shaped capsules from a cat, and in each one of those capsules is a little parasite. You would probably like to know some further particulars of the life-record of this parasite; how it gets into the human territory, and, in short, all about it. Those who are fond of underdone pork, and who happen to persevere in eating a quantity of it in the trichinised condition, will assuredly be liable to infect themselves with the parasite. The flesh of the pig is apt to contain these small capsuled trichinæ. They are so small that their length does not exceed the 1-25th of an inch from head to tail. When the consumer has eaten his meal he will, if he has swallowed half-a-pound of well-trichinised flesh, have taken into his stomach many thousands of these little parasites. But they are only larvæ, or worms, in a juvenile state of development; and you will say, therefore, that they would do him no harm. Far otherwise.

Although they are only in the larval stage of development, it suffices for them that they remain inside the new bearer forty-eight hours, for they will by that time have become converted from the larval condition of growth into the mature adult trichina. Their growth is very rapid, and when they have arrived in the alimentary canal of the human bearer or host their size becomes greater, but yet not very great. I have both males and females figured here. The male trichina is only 1-18th of an inch long, and the female, although she is very much larger, only one eighth of an inch long; so, after all, it is a very tiny parasite. Small though it be, it is able to produce wonderful effects. When these parasites have been comfortably lodged in our interior for six days, by the end of that time an immense number of little trichinæ (the progeny of the full-grown parents) will have made their appearance. They swarm out of the parent *Trichinæ* by hundreds, thousands, and tens of thousands; thus collectively amounting in a single bearer to many millions. Well, what becomes of them? They have got into the alimentary canal. The embryos are very minute, not more, perhaps, than the thousandth of an inch long in the first instance. Their smallness, their toughness, their strength, and their armed mouths, enable them to bore directly through the walls of the alimentary canal, and thus the progeny is dispersed in all directions. They bore through the tissues and make their way to the surface of the body; they stop at nothing; they pass through almost every structure except bone, until they arrive at the muscles. They even pass through the heart; not finding its muscular substance a suitable permanent residence. During these wonderful wanderings or migrations (for all parasites have a tendency to migrate) you have, as it were, an army of say fifty millions of these liliputian creatures; and the consequence is that the unfortunate host suffers the most agonising pains. He imagines perhaps that he has got the gout or rheumatism, when it is simply a disorder caused by the wounds inflicted by these little creatures. If he happens to have eaten very heartily of the trichinised pig, of course he stands a chance of being killed. What is enjoyment to them is real pain and sorrow to him. When they have bored their way through the tissues (supposing he does not succumb to the wounds inflicted) they settle down in his muscles in place of the pigs, and there they make to themselves comfortable residences. These residences show themselves ultimately in the form of little capsules such as I have already described, and there they remain. Then you will say, "What becomes of them ultimately?" They simply wait there hoping that some person will come and devour the host: for if any one should play the part of cannibal (and there are cannibals still in existence), he who played the part of cannibal

would in his turn be trichinised. If the flesh of the human host is not devoured, what happens? A natural cure is effected. It seems to be the prerogative of nature in all cases where wandering parasites get into the human territory, that they shall live there for a certain time only; this length of time varying with different species. In all cases, sooner or later, they perish by the process which is called calcareous degeneration. They become converted into little particles of lime; and thus the cure is effected. Such are some of the strange phenomena undergone by the little flesh-worm. One of the most interesting points about the process consists in the rapidity with which the development takes place. You have these creatures passing from the capsuled condition to the adult condition in two days; from the adult the eggs are given off; their contents in six days more being converted into little embryos, which pass through the tissues of the ultimate bearer to his muscles; so that in a period of three weeks, altogether, the whole life-cycle of the individual is completed.

Some have asked the question, "Could we not get on very well without these entozoa?" I answer—"We could." I do not think that there is any necessity that we should be trichinised, or that we should play the part of host to these creatures. Nevertheless, as a matter of fact, hundreds of people in Germany have been trichinised, and scores of persons have perished from *Trichina*. Then, you will say, "What general conclusion can be drawn from the data given? What is the real part these creatures play in the economy of nature?" The question is applicable not only to *Trichinæ*, but also to other kinds of parasites, some of which pass through far more astonishing transformations.

Well, that question can be answered in two ways; first, as regards the creatures themselves, and, secondly, as regards the creatures they inhabit. You must meet the question as follows: I would say, as regards the creatures themselves, that the part they play in the economy of nature is none other than that which is played by all carnivorous animals; for, as it was admirably put by Professor Leuckart some years ago, "whenever an animal is too weak or insufficiently armed to overcome and destroy another creature, to which or upon which its instincts direct it to seek for food and nourishment, then it must content itself by robbing the juices of the creature, its flesh, its blood, or its tissues." The only difference between a tiger and our little *Trichina* is, that while the tiger can kill its victim by a single blow, it sometimes takes one hundred million of these *Trichinæ* to overcome the host which it inhabits and victimises. It should not be forgotten that in the island of Singapore 400 natives are killed annually by tigers. The tiger kills man to obtain food; the *Trichina* penetrates the

human frame for the same purpose; and there is, therefore, no essential difference between the tiger and the *Trichina* in this matter. The part they respectively play in the economy of nature is one and the same. It is a strange reflection!

Well, but seriously, let us try and tackle this matter a little more closely, for I know it is one of those subjects which, when handled by people entertaining what may be called old ideas, is very apt to produce an unfavorable effect upon the mind. Brought up in the notions of the past, such a person does not like to think that these creatures can have been expressly made to occupy the human and other territories. It seems queer to him that human beings should be infested by horrid parasites, which as they pass through his tissues give rise to pain and trouble; and he is at first inclined, perhaps, to set up a sort of non-Providence theory, and to say, in effect, "Well, that cannot be a very benevolent purpose which has animated the author of these creatures. What can be the meaning of it?" Now I have a sympathy with people who think in this way, because I once thought so myself. As I said before, this is just one of those subjects which ought not to be handled by narrow-minded persons. Any one who studies parasites and does not acquaint himself with what is going on in other more noble fields of science around him is very apt to get contracted views of the economy of nature, and especially as to the why or wherefore anything was created. If such a person will only reflect awhile, and think of the thousand and one blessings which surround him; if he will reckon up all the multifold advantages which he enjoys as the highest of the creatures occupying this earth, putting the group of ills on one side and the advantages on the other, then I apprehend that he will come to the conclusion that, on the whole, there is much to be thankful for.

If you do not see this, allow me to press it further by evidence before us. Here, in common with the canine, ovine, and bovine hosts, we share what I call, speaking figuratively, the privilege of entertaining a series of parasites. It is rare that we have more than one of those visitors or guests at a time, very rare; but see now the advantage that we have over animals. Here we are, placed on a planet which has undergone marvellous changes, and, at length, we share with animals this peculiar and disagreeable prerogative. But mark you the difference. Whilst animals are liable to be thus infested, they have not the possession of such a reason as we have. Would that the gift were more exercised! We have put into our hands an instrument—the reason—by the aid of which we can not only cure ourselves, or be cured of disorders which are caused by these parasitic creatures when they invade us, but what is better than that, we have—by the aid of

science and by no other kind of teaching—we have, I say, hit upon a method of preventing many of these disorders. It is therefore obviously and clearly our own fault if we suffer very largely from parasitism. Those who delight to stifle the intellect and who would prevent us carrying out our researches are responsible for many hindrances in this connection. Since, then, we have a clear advantage over "the beasts that perish," I hold that we ought to rejoice in the elevated position we occupy; and you may be sure that in viewing such questions as these the larger the range of vision you take the more likely are you to arrive at healthy deductions from recognised facts.

I will now explain something specially peculiar and interesting. You will remember that I spoke of the tape-worm as forming a colony of individuals ranged in single file. I have performed a series of experiments, and those experiments have resulted in giving us a more perfect knowledge of the entire life-history and mode of development of the beef tape-worm. I will explain to you one kind of experiment I made. I took a portion of a tape-worm, comprising several of the joints or segments towards the tail end. Each of those joints when perfectly ripe or matured contains, at least, 30,000 eggs; therefore you can easily reckon up how many there would be in 12,000 joints, supposing all were mature. I took a number of those joints, I say, and put them into milk to make them easy of administration, and with the assistance of Professor Simonds and other friends fed a calf with them. Well, they went down, and the calf was none the worse apparently. However, after a time—I won't describe to you the symptoms—it was quite evident that something had happened. Now, what had taken place was this. Some thousands of eggs had been swallowed. Of those eggs all that were perfectly ripe contained in their interior each a little creature called the six-hooked embryo. This small embryo has a round body, provided with two needles in front, and a pair of hooks on each side. With the two little needles it bores, and with the two pair of hooks, placed at the side, it tears the flesh of the host. After the calf swallowed the eggs the shell of each little ripe egg was dissolved by the gastric juice of the fourth stomach; all the little embryos thus making their escape. This was, you see, kindness to the embryos if it was unfair to the calf—communicating pleasure to 30,000 at the expense of one. I believe that principle of action—"good to the many"—is a sound one. The thousands of little creatures, rejoicing at being set free, swiftly made their way through the tissues of the host. The little calf did not succumb to these wounds, as the human bearer often does to the trichinæ. By our assistance it recovered. Well, we calculated how long it would be before these little embryos would arrive at

the higher larval stage of development; and we had indications afforded us that it would be three months. So, at the expiration of three months, our calf, which was now a strong animal, was slaughtered—for the market you would say, perhaps. No, not for the market. It was slaughtered in the cause of science and humanity; and when we removed the external parts, it was found that all the muscles, especially the superficial ones, were filled with the higher larvæ of this parasite. The larva, measle, or bladder worm, is called, scientifically, the *Cysticercus bovis*.

Thus we reared in this calf many thousands of these parasites. Now observe—supposing we had sent that calf to market, what would have happened? Every individual who partook of the veal, and who did not, in cooking, raise the temperature to 145, would undoubtedly have been liable to have had developed in his interior the adult form of this particular parasite. How do we know that? We have experimental proof in various ways. A gentleman in India has lately had the courage to induce a Mahommedan boy to swallow some underdone meat of this description purposely, and the result was that the boy had the privilege of playing the part of host to as many tape-worms as he had swallowed examples of this little cysticercus. I hold in my hand the largest specimen I have ever seen. It was brought from India by Dr. Joseph Fleming, having been taken from meat served out to our troops as rations. What happens when the measles are swallowed is this—the bladder-like part is immediately digested, but the head and upper part of the neck are not digested. These latter pass down from the stomach into the alimentary canal, and the head, by means of the suckers with which it is furnished, then adheres to the lining membrane of the alimentary canal. Next, a process of budding commences, and in three months the worm is fully developed. Such astonishing phenomena as these are not the result of disease or accident; for they constitute together the life-cycle of a creature expressly organized to lead a parasitic mode of existence.

I never yet heard of an English butcher who had ever seen one of these parasites; and yet, I believe that at this moment at least 10,000 persons in this country are playing the part of host to these creatures. Butchers are profoundly ignorant people in this respect. But you will say, "How do the cattle get the parasites?" I will explain. Millions of these creatures pass from their human bearers every day in this country, with other things that are vile. You know that Shakespeare says, "Evil things do fastest propagate." These evil things make their way into the sewage (which it is now the fashion to spread over the land far and wide) and they are thus distributed by millions amongst the delightful verdure on which our cattle graze. The eggs are thus

often taken into the mouths of animals along with green fodder. Every egg swallowed from *fresh* sewage becomes a measle, and every measle that is in the flesh of the animal goes to the market. It is thenceforth liable to be sold and eaten, and will afterwards become converted into a tape-worm, provided the purchaser does not take the precaution of having the food properly cooked. Here is the value of reason. The animal neither reasons about it, nor does it cook its food. If you would avoid these things you must simply have the food well cooked. A temperature of 160 Fahr., if prolonged, will be sufficient to kill the *Trichina*, whilst 140 degrees of heat will destroy the *Cysticercus bovis*.

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ON FOOT-AND-MOUTH COMPLAINT OF CATTLE AND OTHER ANIMALS; WITH REMARKS ON THE GENERAL CHARACTERS OF THE DISEASE AND THE CAUSES WHICH LED TO ITS RECENT EXTENSIVE PREVALENCE IN THIS KINGDOM.

By G. T. Brown, Chief Inspector in the Veterinary Department of the Privy Council, and Professor of Physiology and Therapeutics in the Royal Veterinary College.

(*Continued from p.* 128.)

General characters of Foot-and-Mouth Distemper in different Animals.

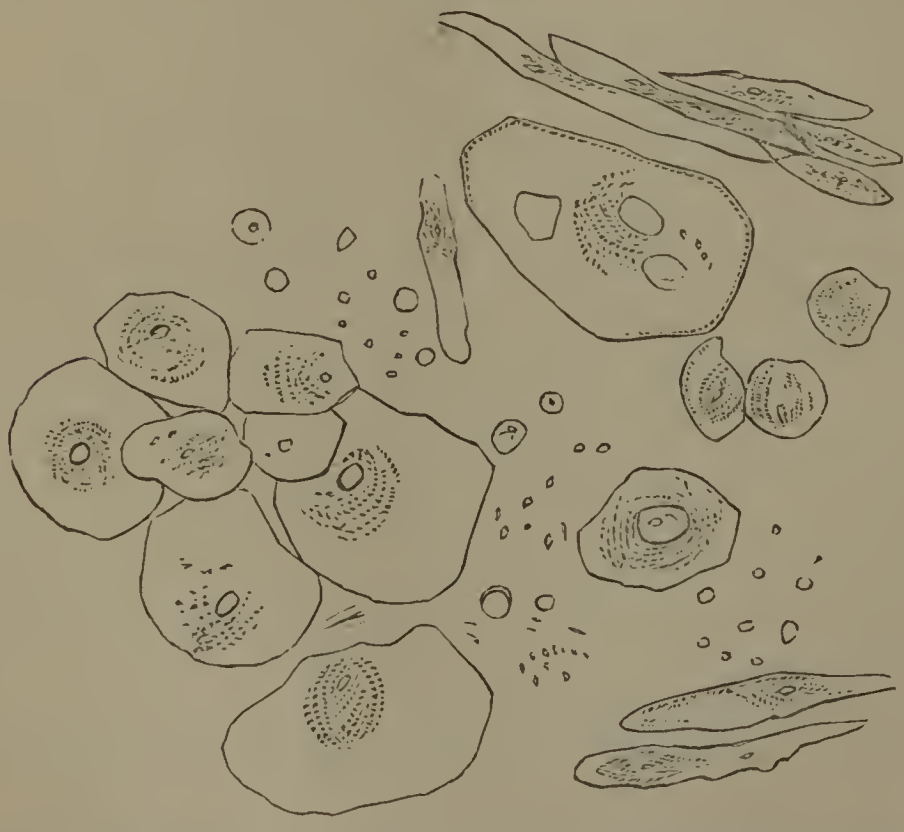
Of the various terms which are used to indicate this disease perhaps epizootic aphtha or eczema is the best. The expression foot-and-mouth disease conveys the erroneous idea that the affection always occurs in the mouth and feet, whereas other parts of the body are commonly attacked, and one of the parts referred to in the popular title may be entirely free. Essentially the disease consists in general irritation of the tegumentary and mucous structures, with febrile disturbance indicated by an increase of temperature. Introduction of the *contagium* into the system of a healthy animal is the only known cause of the disease.

After the poison enters the blood a period of two to four days elapses before the malady declares itself. This period is termed the incubative stage, which in exceptional cases is prolonged to a week. The first sign of infection having taken place is the rise of internal temperature three or four degrees;

in different cases the thermometer will indicate in cattle 104° to 105°, and in sheep 104° to 107°. Shortly following the rise of internal heat the well-known signs of the affection present themselves in quick succession.

Referring first to cattle, a marked symptom which is not always present, is the peculiar smacking or sucking noise which the animal makes with its mouth; discharge of saliva may often be noticed early in the disease, but this symptom by itself is not sufficient, as it is commonly present when animals have been long kept without water. A characteristic sign of disease in the feet is afforded by a peculiar movement of the affected limb, resembling an attempt to kick something off the foot; this inclination is most marked when the hind feet are attacked. As the disease advances the animal stands in an uneasy position, often shuffling its feet and moving with difficulty; blisters appear between the claws and on the posterior part of the feet immediately above the hoofs, on the udder of milch cows, inside the lips, and on the tongue and palate. According to the severity of the attack will be the extent of these lesions; in mild cases only the mouth may be affected, and that to a slight extent, or the feet may be attacked alone. Very seldom are the vesicles developed to an equal extent in all the positions mentioned,

No. 1.

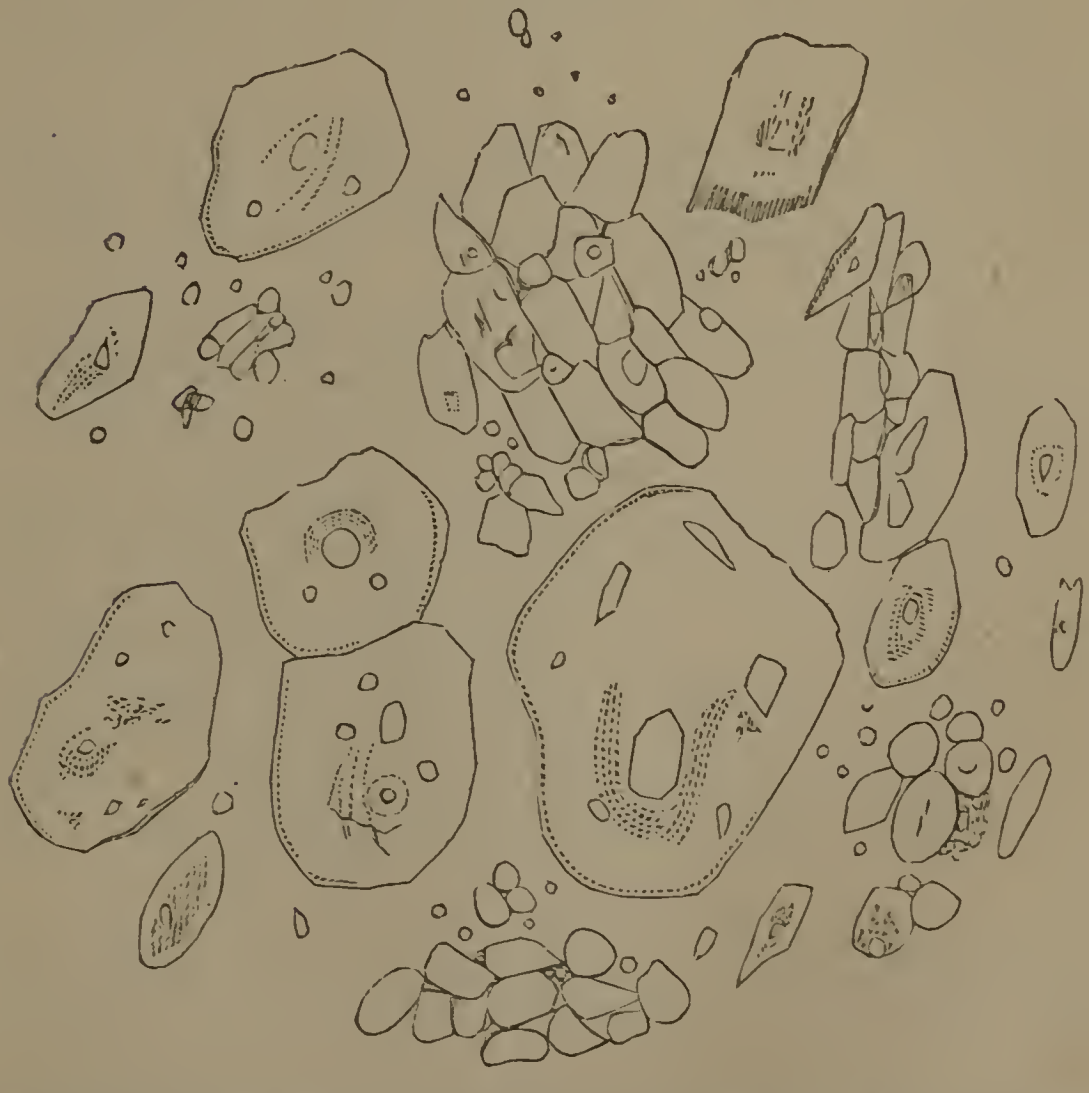


Microscopic appearance of a mass of curdy exudation from the posterior part of the tongue of an Irish heifer which died of virulent foot-and-mouth disease. Magnified 400 diameters.

but in all cases there is a tendency to the separation of the epithelial and epidermoid covering of the mucous membrane and skin; and it has been observed that the surface of the integument is desquamated in the form of dried scales for some time after recovery. Sometimes a quantity of yellow curdy exudation is formed at the posterior part of the tongue and on the palate somewhat resembling the exudation in cattle plague. A very remarkable specimen of this kind was taken from an Irish heifer which died of foot-and-mouth disease at Thirsk in 1867. A microscopic examination of this deposit proved it to be simple epithelial matter, as shown in the illustration No. 1.

Soon after their appearance the vesicles become ruptured, and the contents, a clear limpid fluid, containing few organic molecules, escape. Under favorable circumstances the healing process advances rapidly, the abraded surface is covered with a yellowish mass of exudation, which is ultimately condensed to form the epithelial covering. This

No. 2.



Microscopic appearance of yellow mass on the surface of a healing abrasion after the rupture of a vesicle. Magnified 400 diameters.

yellow mass has been examined by the microscope, and found to consist of epithelial cells, which are represented in the next figure.

When the disease is fully developed, all the secretions contain morbid elements, but, rather curiously, the saliva, which is the fluid most capable of conveying the disease, shows the least evidence of change; when obtained as free as possible from the mucus secreted by the glands of the membrane lining the cavity of the mouth, it is quite pellucid and contains minute bodies, which move with rapidity, these are sometimes found in considerable quantities, and in many specimens bacteria and vibriones are also detected, similar in form and character to those which are depicted in the illustration No. 3, page 459, as they occur in the milk of diseased animals.

These peculiar bodies (bacteria and vibriones) are developed in fluids which contain a small quantity of animal matter, and they may therefore be taken as an evidence of decomposition. The fact of their existence in the blood and secretions of a living animal is always significant, but the discovery of them some time after the fluids have been separated from the living body is a matter of no moment.

Bacteria and vibriones have been detected in the limpid fluid of the vesicles with small masses of living germinal matter, and in the discharge from the eyes minute moving bodies have also been seen.

Microscopic examination of the blood reveals the presence of organic bodies which are always associated with a diseased condition of the fluid. First, the red blood-discs, on which the colour of the blood depends, are covered with minute projecting points, instead of being circular in form and smooth on the surface. There is always an excess of the colourless corpuscles, and there are also small spheroidal and elliptical bodies, which move rapidly in all directions, and bacteria and vibriones are found in large numbers in the advanced stage of the disease; their presence is indicative of the malignant form of the affection, in which the condition is rather that of blood-poisoning than simple foot-and-mouth complaint.

Milk taken from cows affected with the disease presents appearances which are very characteristic, but which vary much according to the stage of the disease. Most of the specimens examined had a low specific gravity, 1024, although in some instances when the quantity which was yielded was very small the normal specific gravity, 1032, was reached,

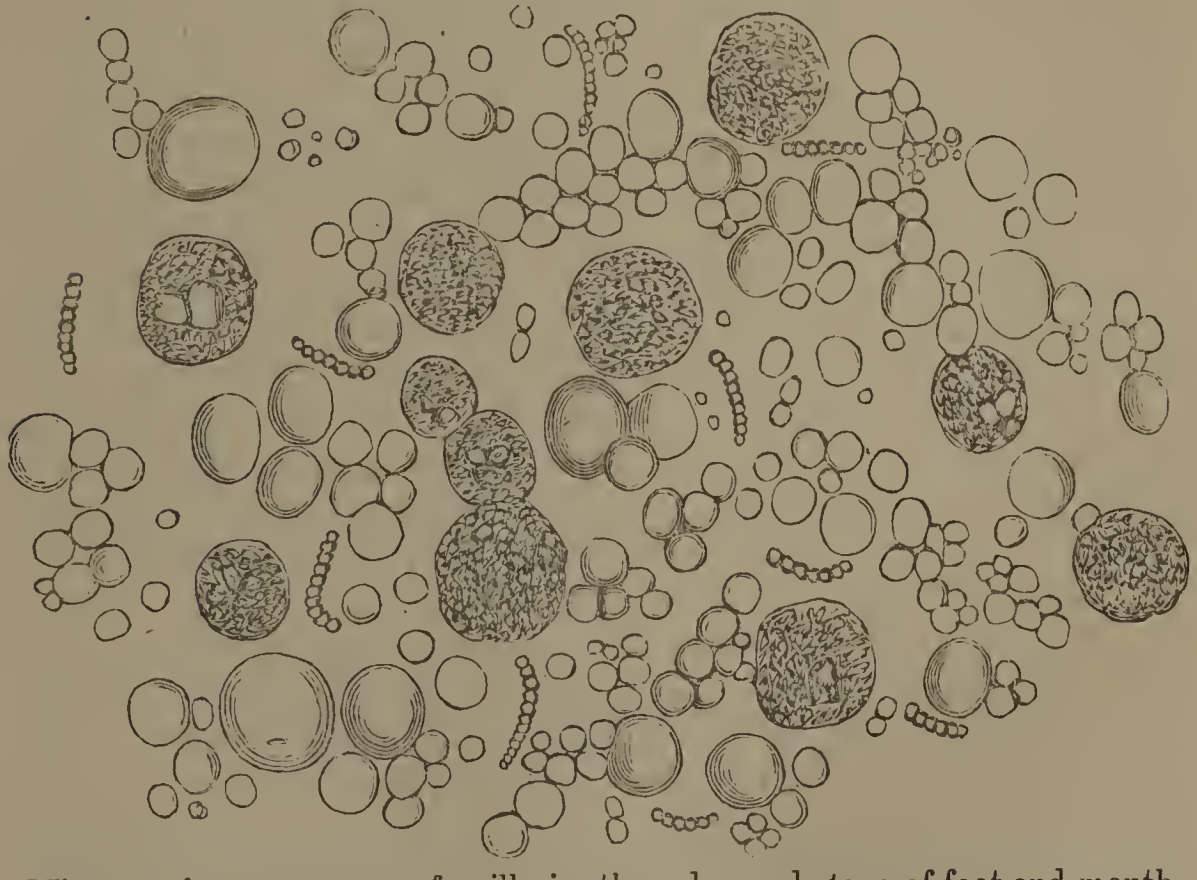
and now and then exceeded, but in these instances the fluid was abnormal in character, being charged with large exudation cells, and what is more significant, bacteria and vibriones were abundantly present.

The drawing which is represented in the next illustration was taken from a specimen of milk obtained from a cow which had suffered from the disease for ten days, and it by no means exaggerates the proportion of diseased elements in the milk.

In cases where the udder is seriously affected, the secretion of milk is almost arrested, and the little fluid which is obtained is highly charged with inflammatory products. Nearly all the specimens of milk obtained from cows affected with foot-and-mouth disease, however, contained more or less of the abnormal elements represented in the drawing, and in some the pus-like cells remained for several weeks after the animals had quite recovered.

Boiling the milk from diseased cows has considerable effect in retarding its decomposition, but it does not arrest the movement of the minute bodies which are constantly

No. 3.



Microscopic appearance of milk in the advanced stage of foot-and-mouth disease, showing, besides the smooth circular milk corpuscles, large dark granular cells, many chain-like bodies (vibriones) and moving bodies composed of two elliptical links (bacteria). Magnified 400 diameters.

present. Of the deleterious effects of the milk of diseased cows upon the systems of other animals no doubt can be entertained. Sucking calves have been frequently poisoned by it even before the cow gave evidence of the disease, which then existed in the incubative stage. Pigs have been repeatedly infected by the milk when given to them warm from the cow, but the injurious qualities seem to be modified by boiling the fluid or keeping it for some time before it is used. Undoubtedly the safest course is to destroy it; but, if this is not done, it should not be given to pigs or other animals until it has been well boiled, and then allowed to get cold. As to the use of the milk for human consumption, it is sufficient to say that no one who had seen the fluid under the microscope would patiently contemplate the possibility of its being employed for the food of man, putting out of the question any risk of the disease being communicated to human beings by such means.

In its uncomplicated form foot-and-mouth disease ends in restoration of a healthy condition of the affected parts, and of the system generally, in a week or ten days; but various circumstances tend to retard its favorable course: unsanitary influences, existence of other diseases, debility, bad treatment, all have the effect of retarding the expulsion of the poison, and leading to a diseased state of the blood and the fluids derived from it.

Animals under these circumstances become emaciated, the abrasions of the buccal membrane advance to the condition of ulcers, the hoofs become loosened by exudation from the vascular membrane of the internal foot, abscesses form in the areolar membrane under the skin; skin wounds caused by the animal lying down assume an unhealthy character, and large portions of the tissue slough away, and the beast ultimately succumbs to a state which may correctly be termed putrid, otherwise it is destroyed as useless owing to the hopeless condition of the feet, and the general prostration.

Foot-and-mouth disease is sometimes complicated with more malignant diseases; as splenic apoplexy, apoplectic congestion of lungs, and other forms of blood disease; the fatality which attends these complications cannot properly be referred to the foot-and-mouth complaint, as the maladies themselves are exceedingly fatal, and it is probable that their virulent nature is not materially modified by the existence of the milder affection in conjunction with them.

An attack of foot-and-mouth disease does not protect the animal from any other disease, but it has usually been held

that a recovered animal was safe from a return of the same affection; and there is evidence that a certain amount of protection is afforded against a second attack, although the system is not rendered absolutely secure for any length of time.

Instances of animals being affected with foot-and-mouth complaint twice in the space of a few months were of occasional occurrence in the early periods of the disease, and a third attack was not unknown. Recently, second and third attacks at short intervals among cattle have been more numerous, or at least more have been recorded; whether the cases have really been more frequent than in former years, or our attention has been more closely attracted to them, is not quite clear. Veterinary authorities in Switzerland however state, quite as a matter of course, that the susceptibility of the animal's system to the action of the virus is not only not exhausted, but is in no way lessened or othewise modified by an attack of the disease.

Our experience in this country justifies the statement, that under ordinary circumstances, animals which have recovered from foot-and-mouth disease are not liable to the affection again, at a period so early as to excite attention; but it is also true that during the prevalence of the affection in an epizootic form, the liability to infection is indefinitely increased, and at the same time the amount of active *contagium* is also increased. In other terms, there are in the surrounding circumstances during the times of what are commonly called great outbreaks, greater powers of action, and in the animal system a greater susceptibility to be acted on; this susceptibility, which in ordinary seasons is exhausted by one attack, under the new conditions survives two or three accessions of disease. The practical conclusion from these facts is, that the farmer should never consider his cattle secure, but always maintain on his farm the sanitary regulations which will be hereafter referred to.

Sheep are liable to attacks of the foot-and-mouth complaint of cattle, but they most frequently suffer from it in a modified form. The mouth in most instances does not present the indications of disease which are seen in cattle, but the feet are almost without exception affected in a characteristic manner. Much discussion has arisen out of the circumstance that the vesicular epizootic of cattle is often confined to the feet of sheep, and frequent attempts have been made to prove that the disease in sheep is the common foot-rot, and not the epizootic affection which is seen in cattle. It would be impossible by any length of argument to convince a large

class of practical men whose minds are made up on this point, of the fact that a scientific pathologist would have no difficulty in deciding at once, as to whether a sheep were affected with the aphthous disease, or some common form of foot affection; nevertheless no problem in pathology is more easily solved.

Of the several quite distinct local diseases of the foot of the sheep, none is distinguished by the presence of a blister or vesicle in any part of the foot, while in the foot-and-mouth disease there are always vesicles present, or distinct evidence of their previous existence, and there is also a general absence of that condition of hoof which is usual in foot-rot. In exceptional cases the hoofs are elongated, much broken, and sometimes ragged and rotten; but this condition has nothing to do with the aphthous disease, which is indicated by the presence of vesicles between the claws, in the posterior part of the foot immediately above the hoof, and sometimes exactly on the portion of skin between the digits which covers the transverse ligament connecting the two sides of the foot together, and which is rendered tense, and therefore distinct when the digits are pulled apart. When the posterior part of the hoof is separated from the secreting membrane, as it often is in foot-and-mouth disease, the vascular surface is seen to be congested, but there are no signs of the so-called fungoid growths which distinguish foot-rot. In short no two diseases can be more distinct from each other in the local appearances; but independently of the evidence afforded by the diseased parts, there is in cases of foot-and-mouth disease clear evidence of febrile action in the system. The animal's appetite may not be much affected, nor is it necessary that the demeanour should be suggestive of much suffering, but the application of the thermometer will show a rise of internal temperature when the animal is suffering from the aphthous affection. Making allowances for the variation of the temperature in sheep, which in health will range from 101° to 104°, and the increase is quite marked, as the temperature in the diseased sheep will range from 104° to 107°. It will not, however, in the majority of cases, be necessary to use the thermometer to decide the question of the nature of the disease, as the local evidence will be sufficient.

Vesicles in the mouth of the sheep, although not so generally present as in cattle, are very commonly found when they are looked for, but as the idea has long been prevalent that sheep are not affected in the mouth, it naturally has happened that the part has escaped notice, and besides, the lesion is not so prominent as in the mouths of cattle, and,

therefore, not so readily recognised by the unpractised eye. In lambs of a few weeks old vesicles not larger than a hemp seed have been detected on the tongue. Abrasions on the lips and palate are frequently seen in sheep identical in character with those which are observed in cattle; and altogether the evidence of the identity of the disease in cattle and sheep is perfectly conclusive, even irrespective of the admitted fact that the affection is intercommunicable in the two classes of animals.

Goats and deer are liable to foot-and-mouth complaint, but in reference to these animals the circumstances are such as render any minute observations very difficult. Goats are very little used in this country, and deer running wild cannot be critically examined; hence no specialities have been recorded in respect of the disease in them.

Pigs undoubtedly suffer extremely from aphthous disease, and in many localities it assumes among them a decidedly malignant form. Vesicles appear on the outside of the snout and along the edge of the upper lip; on the udder in sows, and almost invariably on the feet; the hoofs are constantly separated from the internal foot and fall off. The sufferings caused by the disease and its result often produce fatal prostration; so often, indeed, that the statement respecting foot-and-mouth disease being a benign affection does not apply to its existence among pigs.

Other animals than those mentioned as being subject to the affection in this country, are included by continental veterinary surgeons among susceptible subjects. Horses, dogs, hares, rabbits, and birds, are said to be attacked frequently, and to be capable of conveying the disease to farm stock. We have no evidence of a reliable kind in proof of the susceptibility of these animals to foot-and-mouth disease in this kingdom.

Horses and dogs, and probably other animals, are sometimes the subjects of febrile diseases in which abrasions of of the buccal membrane occur; and lesions not unlike those of foot-and-mouth disease have been seen in horses in consequence of irritation produced by vegetable hairs; but the true aphthous disease has not been seen in this country, nor has it been found possible to produce it in horses, dogs, and rabbits; and among our birds only common fowls are known to have been attacked.

Losses on account of foot-and-mouth disease may be classified under various heads according to the circumstances in which the diseased animals are placed. Store cattle suffer least; under proper treatment a fatal result is very rare,

and the loss of condition is not sufficient to retard the animal's growth to any serious extent. Fattening cattle are deteriorated in value to the amount of two to five pounds per head, according to various estimates; milch cows experience a loss or considerable decrease of milk, but the most serious losses are those among valuable breeding stock, including death of young animals from sucking the diseased milk, and the frequent occurrence of abortion among cows and ewes. The subject, however, of losses sustained has been amply discussed in the agricultural press, and it is not necessary to reiterate statements which are perfectly familiar to stock-owners, and of the truth of which they are capable of judging from actual experience.

Treatment of Foot-and-Mouth Disease.

The course which has been pursued by the veterinary profession, in reference to the medical treatment of contagious diseases of stock, supplies a positive contradiction to that most remarkable maxim, "Honesty is the best policy." The true policy of the veterinary surgeon is to adopt the practice of the physician, and attempt to cure disease, instead of to get rid of it, by the expeditious method of killing the patient. Veterinary surgeons might have gained the credit of curing all the animals which recovered from disease, instead of incurring the charge which they have themselves invited, of being incapable of dealing with maladies which are no more malignant than those which the practitioner of human medicine successfully attacks. Cholera, typhus, and small pox are, it is alleged, as deadly as any form of cattle plague, and yet no physician thinks of the stamping-out system in reference to them; on the contrary, all the experience of the past, and all the modern resources of science, are brought forward for their amelioration; while, in respect of the treatment of animal plagues, veterinary science pleads incapacity, and recommends the pole-axe.

Human plagues are in fact as incurable as cattle plagues, but the human doctor never deems it his duty to force his convictions of this truth on mankind, nor indeed to utter them at all, save in hesitant whisperings in the select circles of his scientific associates; hence, while the two divisions of medicine are on a par in regard to the effects which they can produce on the progress of epidemic and epizootic diseases, the practitioners of the two systems have become widely separated by the acceptance on each side of entirely

opposite principles; one rejoicing in the belief that there is hope always whilst there is life, the others gloomily accepting the proposition that there is no hope but in death.

Whether or not veterinary surgeons were morally bound to publish their incapacity to cure, and in the interests of the country to recommend killing, is a point for the moral philosopher to determine; there can be no question of the error of policy thus committed, and the censure which the profession has incurred is a just reward for the deliberate abandonment of its true position.

In the true sense of the word all diseases are susceptible of cure, that is, of careful attention; but according to the usual acceptation of the term, only those maladies which can be arrested in their course—cut short, in fact, before they attain their full development—can be called curable. To use a familiar subject by way of illustration—small-pox is by most persons considered to be a curable disease; its fatal character is admitted; nevertheless, various plans of treatment are tried with more or less success, that is to say with more or less disturbance of the average of fatality. Formerly, hot rooms and spare diet were deemed necessary to the cure; now, plenty of cool, pure air and nutritious food are deemed essential, and under the improved system of treatment, in which medicine plays a secondary part, the recoveries are far more numerous than they were under the old method. Still the affection passes through its various stages of incubation, invasion, vesication, pustulation, and desiccation, as though no medical interference were attempted. The disease is not arrested; on the contrary, the greatest care is given to facilitate its development, on the clear understanding that the interruption of the external expression of the disease in the form of a specific eruption, means retention of the poison, and deadly injury to the organism.

A distinction is to be drawn between the cure of a disease by the employment of an actually antagonistic agency, and the recovery of the patient under the careful attention of the physician who has watched, and in some degree guided, the malady through its stages without attempting to retard or modify its development.

Some ten years ago a veritable cure for small-pox was publicly announced, and there was no mistake as to the meaning of the terms employed. The North American plant *Sarracenia purpurea* was said to arrest the development of the pustules by destroying the poison of the disease in the system. This would have been true curative action, positive destruc-

tion of the morbid material, and the arrest of the abnormal process; further inquiry, however, proved that the plant did not possess the power ascribed to it, and the disease remains, in the present state of our knowledge, incurable, that is to say, not susceptible of arrestation by the action of medicine. The most that the physician hopes to effect is to get the disease favorably through its various stages, and to support the system under the exhausting influence of the virus.

In exactly the same sense that small-pox of man is incurable, so is the foot-and-mouth complaint of cattle, a disease much less virulent in character, insusceptible to the action of medicines. A cure for this disease should be capable of arresting the cause of the fever and preventing the formation of vesicles; should, in fact, cut short the morbid process; so that an animal which had been exposed to the infection, and gave indications of being the subject of the incipient disease by a rise of internal temperature, should be restored to health by the use of the medicine, without the manifestation of any further symptoms. No such curative agent as this has yet been discovered, and all the special modes of treatment which have been at different times advocated on the plea of their curative powers, may be safely relegated to the regions of quackery.

Curative means, in the extended sense of the word, may be successfully appplied to foot-and-mouth complaint as to all other diseases; that is to say, the sick animal may be taken care of, the symptoms may be sedulously watched, complications may be dealt with as they arise; strict obedience to sanitary laws may be enjoined, and all hygienic appliances may be brought to bear with corresponding benefit to the patient; but the conscientious practitioner, while he developes all the resources of his art, knows and admits that the means which he employs are palliative and not antagonistic to the morbid processes which he seeks to assist rather than to obstruct. The problem which he has to solve is how to assist in the elimination of a poison, and at the same time to support the vitality of the system, a widely different thing from neutralising the poison or preventing its formation.

The first thing which the therapeutist is called upon to determine is the precise nature of the disease which he is required to treat; without this knowledge his proceedings must be of the empirical order. When dealing with foot-and-mouth complaint, he has to remember that the affection belongs to the class exanthemata, or eruptive diseases, and that

consequently a characteristic development of pimples, vesicles, or pustules, is part of the natural course of the disease through its various stages. Small-pox is distinguished by the successive appearance of the three kinds of eruption referred to; foot-and-mouth complaint is marked by one kind, the vesicular. The virus of the affection acts rapidly; symptoms of fever are manifested soon after the introduction of the poison into the system; the internal temperature rises three or four degrees; the secretion of milk in milch cows is diminished; and experience proves that some of the poison is excreted in this way very early in the disease.

Vesicles, or blisters as they would be called in popular language, begin to appear in from thirty-six to forty-eight hours after infection, as a rule, on the tongue, inside the lips, and often on the skin, especially of the hind legs, immediately above the hoofs, at the heels, and frequently at the junction of the digits.

General irritation exists all over the mucous and tegumental surface, and the epithelium is so far loosened that it may be removed by slight friction. The tendency to desquamation of the epithelial tissue is always most marked in the mucous membrane lining the cavity of the mouth, and in the modified integument which is reflected over the terminal portions of the extremities. The first result is unimportant; but the separation of the hoof from its secreting membrane is, under all circumstances, particularly in cattle, a very serious, and not uncommonly fatal, consequence of the disease, and should be, as far as possible, guarded against.

In a few days the poison of the disease, which, in the act of elimination from the system, leads to the development of the effects referred to, is, in favorable cases, completely expelled, the fever subsides, the loosened epithelium is rapidly replaced by new deposits of normal tissue, and the animal becomes convalescent, suffering only from the exhaustion which is proportioned to the severity of the attack, but from which recovery is very rapid, under a liberal system of dietetics. From the date of the eruption to the time of convalescence, in the favorable form of the disease, an average period of ten days will be occupied; and no medicine which has yet been tried possesses the power to shorten this period, or to arrest the course of the malady. Treatment, therefore, in this type of the disease should be tentative, rather than actively corrective. The duty of the veterinary surgeon is to preserve the normal action of the excreting organs without unduly exciting them, to guard against the tendency to desquamation of epithelial tissue, particularly in respect of

the feet, and to afford all the support to the system which is necessary to counteract the depressing action of the poison.

These indications are fulfilled by the employment of salines, which are best given in the water which the animal drinks, as injury to the mouth by the violent use of the drenching horn is thereby avoided.

Chlorate of potash, sulphate of soda, and hyposulphite of soda, are the agents which are most effective and most easily administered. Sulphate of soda is useful when it is desirable to obtain a laxative action on the bowels. Four ounces of this salt may be dissolved in half a bucket of water, and placed in the animal's reach. The dose may be repeated as soon as the first quantity of fluid has been taken, and again, if necessary, in twelve hours, until the dejections are in a satisfactory state. Chlorate of potash is valuable when the mouth is much affected; the agent passes readily into the blood, and possesses, in addition to its febrifuge properties, considerable power in rectifying morbid changes in the circulating fluid. An ounce of the agent may be given in the drinking-water once or twice a day, according to the state of the animal.

Hyposulphite of soda, like the chlorate of potash, has a decidedly antiseptic property, and arrests putrefactive fermentation, therefore it is effective in blood-diseases; it is tasteless, cheap, and easily obtained, and, in any quantities that are likely to be administered, perfectly harmless. These advantages entitle the drug to a much higher position in veterinary medicine than it has yet attained.

Hyposulphite of soda may be dissolved in the drinking-water in such proportion that the animal may take about four ounces daily for a few days, after which the dose should be reduced to one-half the amount.

Sheep, which do not drink much when at grass, will take the medicine when it is mixed with tempting food, as bruised oats with a little malt; the dose may be calculated at one-fourth the quantity for an ox. In case of cattle refusing to drink the medicated water, the same plan of mixing the medicine with the food may be tried; but if both food and water are objected to when thus medicated, it will be in most cases much better to leave the animal without medicine than to administer it forcibly, unless complications, which require special treatment, should occur. Separation of the hoofs from the secreting membrane will be in a great degree prevented by early attention to the feet, and the necessity for

this special care will be apparent when it is remembered that the majority of the fatal cases of this disease are those in which the feet are chiefly involved in the destructive changes. When vesicles appear between the digits, or upon the posterior part of the foot immediately above the hoof, it may be concluded that separation is likely to commence at both those points. The thin layer of horny matter which in the ox connects the two horny digits together may be disconnected from the subjacent tissue by exudation of serous fluid; and at the same time the horn at the posterior part, which is also thin at its commencement, may become in like manner separated from the membrane which secretes it. In this condition of parts every movement of the animal tends to assist the process of disconnection. When in the act of advancing the animal presses on the toe of the hoof, and the forward movement tends to raise the internal foot out of the horny covering, just as the forward step of a man with slippers on which are down at the heels lifts the foot nearly out of the loosely attached slipper. When the boot is firmly laced to the foot this tendency to lifting of the heel is not felt; but the foot and the external covering, which well represents the hoof, move together as one piece. When disconnection, however, occurs at the posterior part of the hoof even to a very slight extent, movement must necessarily assist its progress.

(*To be continued.*)

ON THE MODE OF ACTION OF IODINE AND ITS PREPARATIONS.

By Professor Sée.

Iodine may be made to enter the system through different channels—viz., the digestive tube, the skin, the mucous membrane of the respiratory organs, and the serous cavities.

The digestive tube is the most certain and natural channel, and it is this which is nearly always taken advantage of. The tincture of iodine is scarcely ever prescribed internally—in fact, it possesses no advantages, but offers, on the contrary, certain inconveniences. If it remain in the stomach in the form of tincture, it produces a caustic effect on the mucous membrane of the digestive organ; but it always combines with a little soda or potash which it meets with in the stomach, and is converted into an iodated alkali. Hence it may be seen that those who administer iodine in its simple

form are labouring under an erroneous impression if they imagine that the drug undergoes no change in the stomach.

The iodide of potassium should not be administered in the form of pills, as it is thus liable to produce a caustic effect on the mucous lining of the stomach; it should always be given in solution. And in prescribing this salt one should always bear in mind that the greater the quantity of liquid in which it is dissolved, the better the absorption. There is, however, a certain limit to the quantity of fluid to be employed, which of course a physician will not exceed, and which it is scarcely necessary even to mention.

The skin has often been selected as the channel for iodine to enter the economy. In employing an ointment composed of iodine in the proportion of one part to ten parts, in certain cases an effect is produced, in others nothing is obtained,—that is to say, in certain cases iodine has entered the organism, in others it has remained on the skin. It is expedient to know under what circumstances the iodine has been absorbed. Divers explanations have been given to account for the above facts. According to Professor Sée, two conditions contribute to the absorption of iodine:—1. To make iodine enter by the skin, the epidermis, which acts as a barrier, must be destroyed. To effect this, strong and repeated frictions of iodine ointment will have to be employed; but it is evident these cannot be continued, and a single friction would be perfectly useless. 2. In examining these facts, it is found that there are cases in which the epidermis has not been in the least affected by the frictions, and in which, nevertheless, the absorption of iodine might be proved. This would appear to be in contradiction to what has just been stated above, but it might be explained by the extreme volatility of this metalloid. When iodine is rubbed into the skin in the form of ointment, it is found in the mucous membrane of the lungs; whereas when an ointment is made of an iodide, the latter is not found in the lungs, because it is not volatile, and does not contain free iodine. Thus it may be seen it is by the air-passages, and not by the skin, that the iodine entered the system; and in proof that this is the case, it is sufficient to leave a phial of iodine uncorked near oneself, and the latter will be absorbed without touching or putting it to the nose, for it is found in the secretions.

Quacks seem to have been aware of this phenomena when they invented the sachets of the powder of iodine, iodised cotton, and iodised flannel vests which are to be worn next the skin. These divers agents possess a real therapeutic

property; but the explanation of their action is the same as that given above—that is, the iodine they contain is absorbed by the air-passages, and not by the skin. If a piece of iodised cotton be placed on the arm, and covered with a watch-glass or a glass bell, nothing will be observed; but in a person who wears an iodised vest constantly, the iodine enters his economy not by his skin, but by his nostrils.

Painting with the tincture of iodine has much the same action; we know to what extent this is now employed, and there is scarcely a pain, a case of scrofula or phthisis, in which it is not resorted to. In phthisical patients, the tincture of iodine externally has taken the place of blisters and cauteries; and the change is certainly to the advantage of the iodine; but its action is not that of blisters or cauteries. Here, also, the same explanation may be given of its action; but there is one effect which is scarcely suspected, and that is, when the tincture of iodine is sufficiently strong, or the painting too frequently renewed, the epidermis is destroyed. The iodine enters the fissures thus formed, and produces inflammation of the cellular tissue, as has been observed at post-mortem examinations. To produce a more direct action on the tubercles of phthisical patients, it would certainly be preferable to place an open phial of the tincture of iodine on a table near the patient, as has been practised by M. Piorry, in order that the iodine may be inhaled.

Iodine baths are also intended to act on the skin. These baths, which used to be much lauded, are now seldom or never employed, as their efficacy is very much questioned. It has been asserted that after an iodine bath this metalloid has been found in the urine. In this case, how did the iodine enter the body? Not by the skin, but by the air-passages; and even then such a result cannot be obtained unless the bath-room be hermetically closed, and the patient remain in the bath some time.

Fomentations are also intended as a means of effecting the absorption of certain medicaments into the tissues. These substances are varied, according to the effect desired—such as the tincture of iodine, laudanum, belladonna, etc. As with frictions, a real effect is sometimes obtained with fomentations, at other times none. This depends on the state of the skin, which is different in different individuals. If the skin be soft and pervious, iodine and other substances may be absorbed; but it is difficult to know when the skin is in a favorable condition for absorption and when it is not. There exists normally on the skin an oily coating, which opposes

the penetration of the iodide of potassium. A soap bath may remove this varnish, but it is immediately reproduced; and individuals who have greasy skins, whatever they may do, will never succeed in making their skin absorb the iodide.

The same may be said of baths composed of the mono-sulphuret of sodium. Little or nothing is absorbed unless the doors and windows are closed, for the sulphuretted hydrogen which is evolved is about the only active agent, as it is taken up by the respiratory apparatus. This would explain the superiority of the sulphurous waters—such as Luchon, Barèges, which whiten on being drawn—over those that do not whiten, as Amélie-les-Bains. Iodised baths owe their efficacy to the iodine being absorbed by the respiratory organs.

There are some natural iodated waters—but they are rare—in France; there are only those of Salins and Salies, in Béarn, and it must be admitted that they are not very rich in iodine. In Switzerland they have the waters of Saxony; in Prussia, those of Kreutznach. These latter cannot be replaced; they are those that contain the most iodide and bromide of potassium combined. Nevertheless, the French might still avoid going to Prussia by utilising hot sea-water baths. The sea-water, and particularly the sea-air, contain a certain proportion of iodine and bromine. But it must not be forgotten that this atmosphere does not extend very far, and that about 400 or 500 yards from the shore we get the breeze, but not the iodised air; to have the benefit of this, one must remain the whole day on the beach, or, what is still better, take up his residence on the sea-coast.

When iodine enters the economy it is easily detected, and is almost immediately found in the urine and in the saliva; but the whole is not found at once. The elimination of iodine takes place more rapidly when it is administered in the form of iodide; but in whatever manner it is given, when the iodide enters the blood it combines with the potassium contained in the corpuscles; and as the salts of potash are very diffusible, it is not surprising to find iodine in the urine almost immediataly it enters the blood. Iodine remains in the economy longer than one would be led to suppose, judging from its facile elimination, and it is found in the saliva after its presence has ceased to be detected in the urine. The elimination of iodine is intermittent, and it has been frequently seen that an individual who had been eliminating iodine that he had been taking, ceases to eliminate for some time and then begins again to eliminate.

The same is the case with arsenic and mercury, particularly the latter. If you mercurialise a dog by friction, the animal may eliminate mercury during two months, two months and a half, even three months with complete intermission. This tardy elimination may be explained by the fact that the drug does not remain in the blood, but in the organs.

We have seen how iodine enters the blood, and, without stopping to inquire whether it is there in a state of free iodine, or of an iodated alkali, or of albuminate of iodine, we shall successively study its action on the blood, on the circulation, on innervation, on nutrition, and on the organs of elimination, which will be treated of in the next lecture.

THE MICROSCOPIC CHARACTERS OF ATMOSPHERIC DUST.*

Dr. Burdon Sanderson, in No. 54 of the *London Medical Record*, says that this investigation was undertaken in order to ascertain whether any connection could be established between the microscopical characters of the organized particles found in atmospheric dust, and the prevalence of epidemic diseases. The observations were made in Calcutta and the neighbourhood.

The author employed for the purpose of collecting the formed particles contained in the air the instrument first devised by M. Pouchet, to which he gave the name "aeroscope." This instrument, which has been modified by various observers, particularly by Dr. Maddox (see his paper on the subject in the *Monthly Microscopical Journal* for 1871), has been further improved by Dr. Cunningham. As now used it consists of a large vane, to the axis of which a funnel is fixed horizontally in such a way that its mouth faces the wind. The tube of the funnel is drawn out to a capillary orifice, opposite to which an ordinary cover-glass can be so placed that the current of air as it issues from the orifice is directed against it. After a few hours, or days, the exposed surface of the glass becomes covered with a more or less circular layer of dust, which can be examined microscopically with great ease after the addition of water or other suitable liquid to the deposit. This apparatus was set up at Calcutta and in the suburb of Alipore, in the open air. It was also used to examine air derived from the Calcutta sewers. The method

* "On Microscopic Examinations of Air." By Dr. Douglas Cunningham, M.B. (Appendix to the 'Ninth Report of the Sanitary Commissioner with the Government of India,' 1872.

of recording the results was to figure every object of organic form that presented itself in the dust disk. The results were as follows.

1. That bacteria "can hardly ever be detected among the constituents of atmospheric dust," but "are frequently to be found amongst the particles deposited from the moist air of sewers." 2. That "the addition of dry dust which has been exposed to tropical heat, to putrescible fluids, is followed by a rapid development of fungi and bacteria, although recognisable specimens of the latter are very rarely to be found in it while dry." 3. "That spores and other vegetable cells are constantly present in atmospheric dust, and usually occur in considerable numbers. The majority of them are living and capable of growth and development.' 4. That no connection can be traced between the number of organisms present in the air, or the presence of any special form of organism and the prevalence of any epidemic disease. 5. That the amount of inorganic and amorphous particles suspended in the air is dependent on the moisture of the atmosphere and the velocity of the wind, but that these conditions do not influence the number of organized particles.

The research is important, as affording evidence more decided and more positive than any which has yet been published, (1), that atmospheric dust consists largely of organic forms (in contradiction to the assertions of the French heterogenists), and (2) that these forms are almost entirely those of spores of fungi. The most important results bearing on pathology are, first, the additional proof given that bacterial matter can be carried in the air in such a state as to determine the contamination of liquids capable of supporting bacterial life, even when the air is much drier than it ever is in Europe; and secondly, the confirmation which it affords of previous observations, that bacteria exist in atmospheric dust so sparingly that in general they cannot be detected.

DURANTE ON THE TERMINATIONS OF THE NERVES INTO THE CORNEA.

(Communicated to the *London Medical Record* by A. Henry, M.D.)

Dr. Durante in describing the results of researches on the nerves of the cornea made by him in the anatomical laboratory in Rome (*Rivista di Medicina, di Chirurg. e di Terap.*, and *Gazz. Clinica di Palermo*, August and September), states that, by soaking the cornea of batrachians, rabbits, and dogs,

in solution of chloride of gold, and keeping them at a temperature of 88° Fahr., he was, at the end of four days, enabled to see a very distinct network of nerves. When a combination of nitrate of silver and chloride of gold is used, the intercellular substance is sometimes coloured; not the fibre, which appears like a vein or capillary charged with nitrate of silver.

In frogs, the nervous trunks, from six to fifteen in number, pass into the cornea at the level of the internal elastic coat, lose their medullary sheath, and subdivide into numerous fibres, which become interlaced, and form a plexus in the interior layers of the cornea. This plexus gives origin to many other fibres, which spread out in the anterior layers of the cornea, and give off branches at a right angle. These branches in their turn subdivide in the same way, forming a network of fibres through the whole thickness of the cornea. The axis-cylinders become separated from the primitive fibres, and pass in a straight line to the cylindrical epithelium, among the layers of which they follow a winding course as far as the last layer but one, where they form an irregular network, which is best seen in sections made parallel to the anterior surface of the cornea.

The arrangement of the nerves in the cornea of the rabbit differs from that in the frog, both in direction and in mode of distribution. The nerves, sixteen to twenty in number, penetrate the cornea towards the outer part, and form a plexus. The fibrils which penetrate the epithelium proceed from the fibres which pass obliquely outwards from the plexus. Beneath the epithelium the fibres are divided into tufts and fibrils, which penetrate the epithelium, some directly, others after a short passage, and form in the penultimate layer a very fine fibrillar network, with narrow meshes. Some of the fibrils form loops in the deep epithelial layers.

In the dog, the nerve-trunks entering the cornea are smaller but more numerous than in the rabbit, and are distributed nearly in the same manner. Some of the fibres pass directly to the under surface of the epithelium, where they divide into numerous primitive fibrils, which run parallel to the anterior surface of the cornea. From these, other finer fibres are given off, which, having reached the last layer but one of the epithelium, form the network which has been already described.

Dr. Durante did not find nerve-cells or corpuscles among the fibres, nor any termination of the nerves in cells.

ON THE ANATOMY AND PHYSIOLOGY OF THE KIDNEYS.

William Stirling, D.Sc., M.B., writes to the *London Medical Journal* that R. Heidenhan (*Archiv fur mikroskopischen Anatomie,* vol. x) recognises in the Malpighian capsules of the dog, cat, sheep, hedgehog, &c., an extra-capillary epithelium as well on the interior of the vascular tuft as on its surface. The author regards the epithelium of the contorted tubules, not as simple cells, but as very complicated organic structures. Part of the protoplasm of the cells has undergone a change, and has become broken up into a series of very fine cylindrical structures, called by the author rods (*Stäbchen*). These rods rest with their outer ends on the tunica propria, and penetrate the epithelial layer in a radial direction, imbedded in a very small quantity of formless substance. What has previously been described as "fine granules" in the ground-substance of the cells, is nothing more than the sum of the optic transverse section of these rods. The author specially recommends the fresh kidney of the rat and hedgehog for observation. Some of these rods are longer, others shorter. Their substance is sometimes clear, at other times granular. In the broadest form, a small strongly granulated mass was found at the outer end, which is to be recognised as a nucleus. In addition to these rods, other morphological elements occur in the epithelial layer. Granules, not naked, but surrounded by protoplasm, and differing morphologically in different animals, lie in the interior of the rod mass. The cells do not come anywhere into direct contact with the walls of the tubes, but on these the rods alone rest. [For the methods of preparation, we must refer to the original.] In the broad part of the loops of Henle, the same morphological elements occur as in the contorted tubules.

In birds, in the part of the kidney corresponding to the contorted tubules, no rods were found, only regular cylindrical nucleated cells. In the frog and triton rods were also observed, though the urinary tubes differ from those of the mammalia in being clothed at some parts with ciliated epithelium. The rods have their greatest extent and development in the mammalia.

The author, from his experiments with indigo-sulphate of soda (that bought in the shops is generally impure), concludes that the kidney is the specific secreting organ for this substance, in the same sense as it is for urea, and that, further, in the excretion of this substance the Malpighian capsules do not act a part, and that the excretion is accomplished by the tubuli contorti. The single tubuli contorti can act indepen-

dent of each other, so that in one a lively secretion may take place, whilst in those in its immediate neighbourhood no secretion is to be observed. The straight urinary tubes do not excrete indigo-sulphate of soda, but serve only for conducting the formed secretion.

Not all the constituents which occur in the urine are secreted in the Malpighian capsules, the author agreeing with Bowman that the capsules secrete only water, perhaps salts of small atomic weight; whilst he thinks the secretion of urea devolves upon the tubuli contorti. What is true of the contorted tubules is also true of the broad part of the loops of Henle.

The author has also found rod-shaped bodies in the fine ducts of the nasal, parotid, and submaxillary glands, but not in those of the sublingual. In animals which excreted blue urine, on stimulating these glands electrically, no blue secretion was obtained; showing clearly that mere resemblance in microscopic structure does not imply identity of function.

LIVE STOCK IN SOUTH AUSTRALIA.

Connected with the statistics of our home supplies of horses and animals of the farm, we extract the following interesting details relating to the live stock of South Australia from the Official Report of 1873.

"The returns under this head are more satisfactory than last year, in all the items a steady, if not important, increase being shown. Horses are returned as numbering 82,215, as against 78,125, or an addition of 4,090, and being exclusive of those in towns and villages. Horned cattle are represented as 151,662, compared with 143,463, showing an increase of 8,199. During the year 7,367 head of fat cattle were brought from New South Wales and Queensland, or 1,367 more than in the previous twelve months. Whether viewed in respect to population or extent of pastoral country, the number of great cattle is seriously disproportionate, and demands grave attention. Compared with the neighbouring colonies, South Australia labours under great disadvantage in the deficiency of large cattle. Ten years ago they numbered over a quarter of a million, and were exported in numbers; now nearly all our butchers' meat is imported, and store cattle are difficult to obtain. The number of sheep given in the returns is 4,900,687, as against 4,412,055, being an addition of 488,632. Of these, 3,384,080 are depastured within the boundaries of counties, as compared with 2,887,861 last year, and 1,516,607

in the pastoral districts as against 1,524,194. The increase altogether amounts to eleven per cent., and, in view of the high price of wood during the period and the number taken by the meat-preserving and boiling-down establishments, may be considered highly satisfactory.

J. BOOTHBY, *Government Statist.*

STATISTICS OF HORSES, CATTLE, SHEEP AND PIGS, FOR 1873.

ACCORDING to the agricultural statistics recently published by the Board of Trade it appears that in 1873 a larger number of horses were returned in Great Britain, and of cattle and sheep, both in Great Britain and Ireland, than in 1872.

The increase in the number of horses in Great Britain was chiefly in the class of unbroken horses and mares solely for breeding, of which there were 16,000 more than in 1872, and 34,000, or 11 per cent., more than in the year 1870. This class of horses numbered altogether 335,000 in 1873, against 319,000 in 1872, and 301,000 in 1870. The number of horses used solely for agriculture in Great Britain was larger by about 3000 in 1873 than in 1872; and the number of licensed horses is estimated at 865,000 in 1873, against 857,000 in 1872.

The total number of horses returned in Ireland shows a decrease of 9000 in 1873 as compared with 1872, but this was chiefly caused by a larger export of horses to Great Britain. The importation of foreign horses into the United Kingdom is increasing. In 1873, 17,600 horses were imported, against 12,600 in 1872, and 3400 in 1871. On the other hand, the export of English horses was smaller in 1873 than in 1872.

The total number of cattle in Great Britain in 1873 was above what it was in 1872 by 339,000, and by 627,000 (or nearly 12 per cent.) what it was in 1871. The chief part of this increase has been in young cattle under two years of age, of which in 1873 there were 269,000 more than in 1872, and 418,000 more than in 1871. Dairy stock, or cows and heifers in milk or in calf, advanced in 1873 by 72,000 over 1872, and by 146,000 over 1871. The supply of other kinds of cattle of two years of age and above, or the butchers' meat stock, was slightly overtaken by the demands of the market, and was in 1873 about 2000 below what it was in 1872.

The stock of cattle has also increased in Ireland, but in a smaller ratio than in Great Britain. The total number of

cattle in Ireland in 1873 was larger by 94,000 than in 1872, and by 178,000, or 4½ per cent., than in 1871.

The stock of sheep in Great Britain, although considerably increased in 1873, is still a little lower than it was in 1869; the reduction of nearly two and a half million head, or about one twelfth of the entire stock, caused by the two dry seasons of 1870 and 1871, not having been yet quite made up. In 1873 there were 1,506,000 more sheep in Great Britain than in 1872, and 2,308,000, or 8½ per cent., more than 1871.

Although the total stock of sheep in 1873 was not quite equal to what it was in 1869, there were about 100,000 more lambs or sheep under one year of age in 1873 than in 1869, due in some degree, perhaps, to high prices causing more lambs to be kept to increase the supply of mutton. The number of lambs, it may be added, would have been still larger in Great Britain in 1873 but for the occurrence of bad weather in the spring, which was unfavorable to the rearing of lambs in the more hilly parts of the country.

Sheep were more numerous in Ireland in 1873 than in 1872 by 224,000, but were fewer than they were before 1870.

The number of pigs, so far as returned in Great Britain, was smaller by 271,000 in 1873 than in 1872. This decrease is attributed to various causes, such as the dearness of potatoes and grain for the feeding of pigs, disease amongst young pigs, and the greater popularity of butchers' meat among the labouring classes.

There was a decrease in the number of pigs in Ireland in 1870, as compared with 1872, to the extent of 341,000.

HORSE-BREEDING ESTABLISHMENTS IN FRANCE.

We extract from the *Daily News*, February 7th, the following pertinent remarks on the subject of horse-breeding establishments in France:

"We must hope, in the interests of the French Army, that the question of breeding establishments, adjourned by mutual consent of the Minister of Agriculture and the commission of the Assembly when his budget was under discussion, will soon receive a definite settlement. Cannons and ammunition can be furnished at a moment's notice, so to speak; but horses cannot be obtained so quickly, and the want of serviceable remounts for the cavalry is even now severely felt. This

delay is all the less excusable because the question is not one of principle but of degree. The utility of Government *haras*, as the establishments for breeding horses are termed, is so far recognised that they exist, and the only point in dispute is as to the amount of money which shall be granted for their multiplication. One of the most successful breeders in France has published a pamphlet to show what is being done in other countries, and how far France still lags behind in the race. He points out the unquestionable superiority of the German cavalry, due, as he maintains, almost entirely to the quality of their chargers, and this notwithstanding the fact that France, with her three and a half millions of horses, has at least a million more than Germany. The inferiority of the French horses he attributes to the want of care in the selection of sires. In Prussia there are nearly two thousand of them, thoroughbreds and others, in the Government breeding establishments. Austria possesses an even larger number, chosen by a capable official, as suited for the purposes of reproduction. Hungary can boast of at least as many; while Russia stands still higher, with some six thousand picked animals. In striking contrast to these telling figures, we find that in France there are scarcely a thousand sires belonging to the Government, with about an equal number that have been 'passed' as suitable for breeding purposes. It is calculated that about five times the number are needed for the breeding of draught horses alone, so the remainder must be recruited from all quarters, without regard to their soundness or other qualifications. This poverty of sires is generally recognised to be the main cause of the deficient supply of horses, and in the bill which M. Bocher, the deputy for Calvados, has laid before the French Assembly there is a proposal that the number of sires shall be annually increased by a hundred until they reach double the present total. It would, perhaps, have been better to reach that figure by a more rapid process; but, on the principle that half a loaf is better than no bread, it may be accepted as an instalment of some larger measure when the demands upon the Minister of Finance begin to diminish. At all events the scheme, as a whole, compares very favorably with the results of the Lords' Committee on the horse supply in England, which, it will be remembered, sat for several months last year, and eventually decided that the supply was not equal to the demand, but that they could not help that. The French Assembly will achieve one piece of useful legislation if they give M. Bocher's Bill their unqualified assent."

CENTRAL VETERINARY MEDICAL SOCIETY.

The ordinary general meeting of the above Society was held Thursday, January 8th, at 10, Red Lion Square, at 7 p.m., the President, F. J. Mavor, Esq., in the Chair. Mr. Moore, sen., laid before the meeting a foot of a horse which illustrated his treatment of sandcrack.

Conceiving that such a hoof requires expansion as being too small for its contents, he further enlarges the fissure and (there being no discharge at the time) sets in a piece of hard wood, retaining it in its place by a horse-nail passed in the horn transversely as a rivet, the hole being burnt or bored with a gimlet; the outer surface is then rasped to correspond to the surface of the hoof; such treatment he had found very effectual. The foot produced showed the downward growth of the new horn (the horse in question was killed owing to another affection). A good discussion ensued on the subject, and the treatment adopted by Mr. Moore was held to be ingenious, and an improvement on the practice of stopping with pitch, gutta-percha, &c. The President then vacated the chair to read his paper, and Mr. Roalfe Cox, V.P., acted as chairman for the rest of the evening.

At the conclusion of Mr. Mavor's paper, *Mr. Clark* asked, in referring to *kali bichrom.*, whether the President used the agent allopathically or homœopathically.

Mr. Hunting could not credit entirely the theory expressed in the paper of every drug increasing the temperature, for the experiments of some German professors gave opposite results in the use of alcohol; the temperature being lowered in every case. There was also to be considered the effect of different drugs on different animals, such as aconite on sheep or prussic acid on the hedgehog, both being able to take large doses with comparative impunity. It would appear that in veterinary practice all were equally successful, though it was quite unlikely that each employed the same remedies.

Dr. Burness said there were but two exceptions known to the rule of drugs raising the temperature; they were alcohol and chloral. That there were many thoroughly specific agents, as, for instance, iodine, quinine, and arsenic, also digitalis; strychnia acts on the motor nerves, the animal feeling till its death, though the limbs be rigid; aconite affects the sensitive nerves only, producing a tingling and numbing sensation with coldness, but the joints can be moved at all times.

At the unanimous wish of the Fellows the further discussion was adjourned till February the 5th. The ballot declared the elections of Mr. Graham Mitchell, V.S., of Melbourne,

Australia, an Honorary Corresponding Fellow, and Mr. George Williams, of Pimlico, a Fellow, as being unanimous.

The President then invited Mr. Strawson (a visitor) to exhibit a dental instrument. Mr. Strawson explained that the instrument was designed by Mr. Thompson, V.S., of Sheffield, who used it with ease and success. It consisted of a pair of long-handled pincers, the nipping faces being curved like those of rowelling scissors, the extremity almost pointed; these nippers, embracing the prolongation of tooth, are brought forcibly together by a screw clamp affixed to the handle end.

The Secretary said he had asked Mr. Strawson to bring the instrument for the Fellows' inspection; he took exception to the great weight of it and awkward and heavy screw clamp, believing that the fixing of the pincers would tire the operator; he also thought that if the pincers were curved at the body they would act better, as affording both hands a better leverage.

Mr. Cox differed from the last speaker about the curving being any advantage; he should approve of the instrument if it were made very much lighter and the clamp dispensed with. This was also the opinion of others present; Mr. Hunting further thought the handles were not long enough. Mr. Cox considered it had an advantage over Mr. Gowing's chisel, by reason of the teeth often having a shelving at the back from attrition, and the chisel not properly embracing the portions to be removed.

A pneumatic aspirator was also shown by Mr. Strawson, and favorably criticised. The meeting closed with a vote of thanks to him.

Present, nine Fellows and three visitors.

MEETING, February 6th.

At the ensuing meeting held Thursday, February 6th, the President occupied the Chair, and on behalf of Dr. Burness himself presented the Society and the Honorary Secretary with a copy of a work on the specific action of drugs, of which he was the joint author.

The President next referred to Mr. Moore's treatment of sand-crack as discussed at the last meeting, and suggested as an improvement that the slip of wood should be more triangular in shape, and the horn be hollowed slightly on the inner side of the fissure, and the wedge driven in from the toe. It thus fitted tight, as shown by two hoofs (so prepared), with fictitious cracks, and, he thought, dispensed with the necessity of a transverse rivet.

Mr. Moore did not agree with the suggestion, believing that the wood would have a greater tendency to continue the crack and widen it.

Mr. J. Woodger, jun., laid on the table a specimen of exostosis

of the os suffraginis, attributable to the animal's slipping upon the asphalte pavement.

Mr. Price showed a fatty tumour attached to the duodenum, which he had discovered in making a post-mortem examination of a horse killed for glanders.

The discussion of the President's essay was then resumed. *The President,* first answering the questions put at the last meeting, said (answering Mr. Clark) that he used *kali bichrom.* in five-grain doses as a restorative dose, *i. e.* a quantity under that which exerts its physiological action; and (answering Mr. Hunting) that alcohol and chloral given in small doses raises the temperature, but taken in large doses considerably lowers it; that atropine acts on the mucous membranes is evidenced by dryness of the tongue; its specific action on unstriped fibre is shown by its action on the sphincter of the bladder and on the gall-ducts.

Mr. Moore said he felt at liberty to quote from the work on the table, of which the paper was an abstract, and he considered it homœopathic; he found that dysentery was treated there with mercurius corrosivus, a sore throat with belladonna, and so on; and why? because the latter produced extreme sore throat, for which reason he condemned the practice of blistering as being a source of extending the inflammation.

In the course of other observations made by other speakers and himself, *Mr. A. Mavor* said the main point of difference amongst them was the dose of the drug and the quantity used as a restorative; he himself was an advocate of giving a quantity in order to cure quickly rather than a number of doses.

Mr. Moore said he wished to state that, a correct diagnosis being made, the proper remedy "must" be chosen, as the drug acts on the disease and not the healthy parts; in his first homœopathic experience he treated by analogy, as in a case of inflamed lung he gave aconite, but when in a very bad stage and of the character of hepatization he employed phosphorus with successful results.

Mr. Mavor, in replying, denied his adherence to any school in particular, saying that in his book all were represented, and he might be equally claimed by either. His theory was, that drugs acted on special parts, not that they produced symptoms analogous to those for which he was about to prescribe. He should disprove Mr. Hunting's statement that a drug received into the circulation might act on any system of organs; as given a dose of sulphur, it forms sulphuretted hydrogen, and not being a nutrient agent, passes out of the system by the skin; digitalis acts on the heart's ganglia, but aconite exerts its influence on the blood-vessels of that organ. In reference to the temperature, he referred his audience to his work as having therein

expressed his peculiar views on the subject. In conclusion he deduced his experiences from facts gained in all schools.

A vote of thanks to the President closed the proceedings.

Present, ten Fellows and four visitors.

JAMES ROWE, junr., *Hon. Sec.*

LIVERPOOL VETERINARY MEDICAL ASSOCIATION.

THE thirty-eighth quarterly meeting of the Liverpool Veterinary Medical Association was held on Friday evening, the 13th of February, in the Medical Hall, Hope Street. The following gentlemen were present:—George Morgan, Esq., *President;* Messrs. Harwood, Kenny, Sumner, Reynolds, Wilson, Heyes, Ackroyd, and the Secretary, Liverpool; J. Welsby, West Derby; W. C. Lawson, Wootton; Woods, Wigan; Yates, St. Helen's; Lowe, Bolton; Smith, Ormskirk; Professor Williams, Edinburgh; Tom Taylor; W. A. Taylor, *President of the Lancashire V.M.A.;* Ireland; A. Gibson, Manchester, and H. Stanley, Birmingham.

After tea, the *President* took the chair and delivered his inaugural address, in which he reviewed the past history of the Association from its commencement, and made mention of those who were amongst its first members, but who, alas! were now no more. He urged the members to cultivate kindly feeling towards each other, as life was short and uncertain. The address was throughout of a thorough practical character.

Mr. Smith, of Ormskirk, exhibited a fine specimen of *osteoporosis* of the head of a four-year-old horse that had been under his care. He was called in to see the animal in May, 1872, when it was suffering from influenza. At this time there was an enlargement between the maxillary bones, and the horse had great difficulty in masticating his food. The animal was also much debilitated, and the heart was enlarged. He ordered succulent food, lime and clay water, to drink, and gave the preparations of iron. It, however, became gradually worse, and being ultimately quite unable to masticate any food was destroyed.

Professor Williams, in response to a call from the President, said that he believed this disease to be a developmental one, as it was nearly always seen in young animals from two to four years old; the vascular and animal basis of the bone appear to develope faster than the mineral is deposited. Some physiologists attribute it to defects in the digestive and assimilative functions, and some think that instead of the lime salts being appropriated by the

bones they are left in the blood, and acting as an irritant are thrown out by the kidneys. The urine is whitish in colour, and contains large quantities of the mineral salts. Professor Williams added that he had seen more cases in Scotland than in England, and chiefly in young Highland ponies, and that he had mostly found the cases to occur in moist, boggy, and badly drained districts. The disease had also of late appeared in Australia and destroyed a number of valuable animals. As regarded treatment he was sorry that he could not suggest any remedy, as all treatment thus far had failed. Lime water had been extensively used, but without effect, as it did not appear there was any lack of lime salts in the system, but rather a want of power in the bones from some cause or other to appropriate them. Professor Varnell had reported a case in an animal six years old, and also an instance where the disease showed itself in one farm in particular; and although the food and water supplied to the animals in the surrounding farms were precisely the same, still the disease never spread further than the one farm.

Mr. Tom Taylor, Manchester, said he had seen two cases in Shetland ponies and one in a black Belgian stallion, two years old, the bones of which were all found after death to be of a porous character.

Mr. Wilson had seen two cases in the course of his experience.

Mr. Harwood had seen two cases in young goats, but the disease was confined to the head.

Mr. W. A. Taylor said he had seen several cases, and agreed with Professor Williams that the cause was defective assimilation of the food that the animal takes. The treatment most likely to do good would be stimulating and nutritious diet.

Mr. W. A. Gibson, Manchester, had never met with a case, and he thought that very many fine theories might be worked out as to the probable cause; but he failed to see any practical result arising from them.

Mr. Sumners had seen a case in a young goat that had none of its mother's milk after being a week old.

Mr. Welsby had known a case when a colt had been brought up entirely by hand and at one year old bony depositions began to form about the knees and head, which ultimately attained a very large size; nevertheless the animal was apparently healthy and was kept at work until it was 7 years old, when it died from congestion of the lungs.

The *President* said that he had had his attention drawn to a case about five years ago by Professor Williams; and he had also seen Mr. Smith's case, and a most remarkable one it was.

Mr. Smith next introduced the case of a horse which he treated for colic in 1860, and from which he took *per rectum*

several calculi, one of which weighed as much as a pound. The animal quite recovered, and was not known to have had another attack for a period of ten years, when he was suddenly taken ill and died in three hours. On a post-mortem examination being made, two very large calculi were found in the large intestine, which together weighed about 12lbs.

A discussion took place as to whether there was any certain diagnostic symptom of the presence of a calculus in the intestine. It was the unanimous opinion that there was not.

The *Secretary* next showed the pelvic bones of eight horses that he had treated for fracture and which had recovered and been at work for periods varying from six months to two years. He also stated that he had in an adjoining yard for inspection by the members *five horses* that had recovered from fractures of this bone and were now at full work, and had been so for periods varying from four months to five years.

After the members had examined the animals, the *Secretary* explained the causes and symptoms of fracture of the pelvis, together with the treatment which he had adopted in all his cases.

The *President* next read a letter from Professor Walley, Edinburgh, complaining of the injustice that was being done the students who entered the Scotch colleges two years or more ago under the old system, and who were entitled to offer themselves for examination next April, but whom the Council had decided could not be examined on the old system.

Professor Williams explained the matter briefly, and said as the case of these students was an exceptional one and would never occur again, and as all law was for the future and not retrospective, he thought that the Council of the Royal College of Veterinary Surgeons ought to grant the prayer of the memorial presented by the students.

After several of the members had expressed their opinion, *Mr. R. S. Reynolds* moved, and *Mr. Yates* seconded, "That a petition signed by the President on behalf of this Association be presented to the Council of the Royal College of Veterinary Surgeons, asking that the prayer of the memorial be granted."

The motion was carried unanimously.

The usual votes of thanks being awarded, the meeting terminated.

C. M. Elam, *Secretary.*

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

THE usual quarterly meeting of the above Association was held at the Blackfriars' Hotel, on December 17th, 1873, W. Augustus Taylor, Esq., President, in the Chair. The following members were present :—Messrs. Greaves, Lawson, Roberts, and Hopkin, Manchester; J. Taylor, Oldham; Wood, Wigan; Lowe, Bolton; Ferguson, Warrington; Woolner, Heywood, and two visitors.

The minutes of the former meeting were read and approved.

The President introduced the subject of the Building fund of the Royal College of Veterinary Surgeons. He also read a letter from Mr. Coates respecting same.

Mr. Greaves objected to the funds of the Associations being used for building purposes. After freely discussing the matter, the meeting was unanimously of opinion, that the funds now being collected ought to be used solely for either building or purchasing suitable premises for the Royal College of Veterinary Surgeons.

Mr. Prescott, of Pendleton, was nominated for membership by the Secretary.

The President introduced the subject of chronic diarrhœa in cattle, which he believed to be sub-acute inflammation of the mucous membrane of the bowels and fourth stomach. Two shorthorn bullocks, aged respectively eight and fourteen months, at pasture in a park, had never done well, and were ill-looking. A butcher and the farmer were of opinion that they were affected with pleuro-pneumonia.

Symptoms.—General depression, excepting when approached; slight husk, staring and harsh coat; thin of flesh. Fæces fluid and dark in colour, with great stench; respiration normal, pulse weak. Animals ruminating occasionally; mucous membrane pale, appetite moderate.

Treatment.—Housed, and gave Creta præp., Gum Opii, and Cinchona, in well-boiled gruel, lime-water, and milk; pulped roots, and all food well cooked; but did not improve. Then gave Bicarb. Pot., Sp. Æth. Nit., and Camphor. Whisky and gin and dry food all no good. Wanted to try arsenic, but Mr. Taylor, senior, objected.

Post-mortem.—Lungs healthy, first, second, and third stomachs healthy; the fourth stomach, mucous membrane affected with subacute inflammation, extending to the duodenum, and existing in patches in the large intestines. Liver apparently healthy,

kidneys healthy; the only other abnormal condition was an excessive retention of bile; half a bucketful.

Causes.—Cannot name them.

Mr. Lowe, in chronic diarrhœa, ordered roots to be withheld, and gave something to soothe the stomach; prescribed starch gruel, flour gruel, rice meal, and Indian meal, and for medicine Opium, Creta, Catechu, Camph. Had seen good results from powdered oyster shells in gruel.

Mr. Ferguson then introduced an interesting case and specimen of abscess in the maxillary sinuses.

Mr. Greaves proposed a vote of thanks to the essayists, which *Mr. Lawson* seconded.

The President, after a few remarks upon the expiration of his term of office, retired from the chair, which was taken by Mr. Greaves.

Mr. Hopkin proposed Mr. W. Challinor for President for the ensuing year. Seconded by *Mr. Taylor,* and carried unanimously.

Mr. Roberts was then proposed, seconded, and duly elected as Secretary.

Mr. Woolner was unanimously re-elected Treasurer.

Mr. Lowe, of Bolton, and Mr. J. Lawson, of Manchester, were elected Vice-Presidents.

TEDBAR HOPKIN,
Hon. Secretary.

THE HIGHLAND AGRICULTURAL SOCIETY AND THE VETERINARY SCHOOLS OF SCOTLAND.

AT the general meting of the Highland and Agricultural Society, Captain Tod (Howden), in directing attention to the patronage which the Society had bestowed on the Veterinary College of Edinburgh, said:

The chair of Cattle Pathology which was established in connection with the Edinburgh Veterinary College has now been in existence for nearly seven sessions. When originally instituted, the Society undertook to give the Professor an annual vote of £100 for five years; the directors now think that the society, as the examining body, should in future withdraw all money grants in aid of professorships, in par-

ticular Veterinary Colleges, and that the advancement of the veterinary art can best be promoted by the Society annually voting a certain number of silver medals to each of the two Veterinary Colleges in Edinburgh, and to the one in Glasgow, for class competition, and a certain number of gold medals, open to all the students who come up to the April examination for the society's veterinary certificate, to be placed at the disposal of the examiners.

Of course, the gentleman who holds the professorship will be paid for the current year, which will make the period for which the grant was voted extend over seven in place of five years.

The Hon. George Waldegrave Leslie expressed a hope that the Charlier system of horse-shoeing would have a better place of exhibition at the Inverness show than it had had on some previous occasions.

Veterinary Jurisprudence.

BRISTOL COUNTY COURT.

(Before Mr. W. F. Woodforde, Deputy-Judge.)

Alleged Breach of Warranty.—Chronic Laminitis.

Hutchings *v.* Redman.

This was an action to recover the sum of £9 13s. for damages sustained through an alleged breach of warranty of a horse. Mr. Benson appeared for the plaintiff, and Mr. J. F. Norris (instructed by Mr. Beckingham) was for the defendant.

The plaintiff is an auctioneer and furniture dealer, carrying on business in Bridge Street in the city, and the defendant is a horse dealer, living in Pennywell road. Plaintiff's case was, that having purchased a horse from defendant, and not being satisfied with the animal, he returned it, and in the beginning of last September he had the one concerning which the present action was brought, and for which he was to pay the sum of £23. A warranty was given with the horse to the effect that the animal was sound and quiet in harness, and free from vice. The money was paid, and the horse delivered to the plaintiff; and for some time it had little or nothing to do. Symptoms of lameness were observed very shortly afterwards, and it was taken great care of for two months, but the lameness got worse, and upon the horse being subjected to an examina-

tion by a veterinary surgeon, it was found to be suffering from a disease called laminitis, of long standing—in fact, that it had been suffering from that disease for upwards of twelve months. This was communicated to the defendant, who refused to take the horse back; and on the 4th of December it was sold in the Bristol repository for £14 odd, and the plaintiff received £13 7s. after paying all expenses, leaving a balance of £9 13s. Mr. Benson further remarked that since the action had been brought the plaintiff sent a second veterinary surgeon to the defendant, who had got possession of the horse, to examine it, but he refused to allow any one to see it.

Mr. G. E. Hutchings, the plaintiff, having been examined, and spoke to the purchase of the horse; he admitted having sent the animal to Weston-super-Mare with four lots of furniture.

Mr. J. Broad, veterinary surgeon, was then called, and stated that he examined the horse in question on the 20th of November, and found that it had disease of the feet of long standing. The animal had evidently been subjected to periodic attacks of laminitis, inflammation of the lamina of the feet. Should think it had been suffering from the disease for a twelvemonth. In cross-examination, *the witness* said a horse suffering from laminitis would be able to take a vanload of furniture from Bristol to Weston-super-Mare. Laminitis very often originated in the horse being driven over the stones.

John Stoyle, formerly in plaintiff's employ, having been examined, and deposed to finding something the matter with the horses' feet, Mr. Norris, on the part of the defendant, said his reply to the action was that the horse was never unsound, and, as far as could be gathered, it was perfectly sound. He commented upon the fact that now the defendant's attention was never drawn to the condition of the horse until the day after Mr. Broad had examined it, more than two months after he sold it. The learned counsel submitted that the injury to the horse was produced through its having been driven over the stones of Bristol.

Mr. Leigh, veterinary surgeon, stated that he examined the animal on the 23rd of January, and found it in good working condition snd sound. Had it driven over the stones, and it showed no symptoms of lameness. It did not appear to have been suffering from chronic laminitis. Cross-examined—Horse dealers sometimes managed to get up horses so as to deceive veterinary surgeons. Would swear that he had never given evidence in that court that Redman had made up horses for the purposes of sale. Could not say how many times he had given evidence against Redman in that court—in cases in which he had sold horses that were unsound which he had warranted sound. When he examined the horse his attention was not called to its feet.

Mr. Jermyn, another veterinary surgeon, also deposed to having examined the horse, and finding it sound and in good condition.

Messrs. Meacham (a cab driver) and *Berry* and *Rogers* (farriers) having been called, *the defendant* was put into the witness-box, and deposed to having sold the horse to Mr. Hutchings. In cross-examination by Mr. Benson, he said he was at the horse repository when the horse was sold. A dealer named Grindle bought it, who lent it to him about a fortnight afterwards, and he had had it ever since. Could not say why he did not have the horse examined before the 23rd of January. Did not warrant all horses that he sold, and could not say how many unsound animals he had had returned to him during the last twelve months.

This being the defendant's case, *Mr. Benson*, in reply, contended that the horse at the time it came into plaintiff's possession had been "got up" for the purpose of being sold to a person who did not understand horses. He also called his Honour's attention to the fact that the horse after the sale was kept for six or seven weeks in defendant's possession before it was examined by the witnesses who had been called on his behalf, and submitted that this was done to get the animal in a condition to enable it to pass a good examination.

His Honour summed up, and gave a verdict for plaintiff for the sum claimed.

In the course of his observations he remarked that he must put aside the evidence of Mr. Leigh, as he seemed to have certified to the soundness of the horse without having made an examination of its feet. It also was a singular circumstance that Mr. Redman should have left the horse seven weeks before he submitted it for examination by Mr. Leigh and Mr. Jermyn.

ARMY APPOINTMENTS.

War Office; *Feb. 13th.*

Veterinary Department.

John Herbert Cox, from the Royal Artillery, to be Veterinary Surgeon.

Walter Boulton Spooner, gent., to be Veterinary Surgeon on probation, in succession to Acting Veterinary Surgeon H. Batchelor, promoted.

RED WATER IN CATTLE.—LETTER FROM PROFESSOR WILLIAMS.

EDINBURGH; *Feb.* 14*th*, 1874.

GENTLEMEN,—Being anxious to make some investigations into the pathology of "Red or Black Water" in cattle, I should be much obliged to any of my professional brethren who have now, or may shortly have, cases of this disease under treatment, for some samples (say one ounce) of urine for analysis. If the samples are accompanied by a brief history of the cases, the favour will be all the greater.

Yours very faithfully,
W. WILLIAMS.

To the Members of the Veterinary Profession.

MISCELLANEA.

REPRESSION OF EMPIRICISM.

M. ISIDORE REMY, Director of the Abattoir at Ghent, although he has retired from civil practice, pursues with a devotedness which does him honour the repression of empirics, who, it appears, are still on the increase in Flanders. In proof of this we call attention to the judgment delivered on the 20th November last by the "Tribunal Correctionel" of Ghent, condemning J. B. De Meyer, a farrier at Oosterzeele, in 26 francs fine and costs for illegally practising as a veterinary surgeon. Our colleague, M. Remy, appeared as a witness at the trial.—*L'Echo Vétérinaire.*

ANECDOTE OF THE LATE MR. PEECH, OF SHEFFIELD.

THE Rev. Dr. Sutton, late Vicar of Sheffield, once said to the late Mr. Peech, veterinary surgeon, "Mr. Peech, how is it that you have not called upon me for your account?" "Oh," said Mr. Peech, "I never ask a gentleman for money!" "Indeed," said the vicar, "then how do you get on if he doesn't pay?" "Why," replied Mr. Peech, "after a certain time I conclude that he is NOT a gentleman, and then I ask him."

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Communications and Cases.

FURTHER REMARKS ON RARE PARASITES FROM THE HORSE.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

In my previous communication respecting certain forms of equine parasites I expressed the hope that additional records would be forthcoming, such as would tend to throw light upon obscure questions in entozoal hippopathology. I also endeavoured to show in what way help might be gained by the publication of merely isolated facts, which in themselves appeared, at first sight, to be altogether valueless. In this connection I further pointed to the eminent services already rendered by Mr. Varnell, especially desiring that others who have more leisure than myself would carry on the movement which he and his colleagues had initiated. Daily occupied professionally with parasitism as it occurs in the human subject, it must be obvious that I cannot devote all my leisure to the study of the "worms" of the domesticated animals; nevertheless, in view of advancing the science of pathology in its bearings on medical and veterinary practice, I find that the study of both human and animal helminthology should be taken together and be treated as of equal importance.

Several gentlemen having responded to my invitation requesting the transmission of specimens of equine and other entozoa for the purposes of identification and research, I am particularly fortunate in being permitted to utilise their donations in the interests of the science that I have so much at heart. One correspondent, however, has demanded a vast amount of "private" information, without according to me

any equivalent privilege in connection with his specimens. To requisitions that are *reasonable* I am always ready to make reply according to the best of my ability.

To Mr. William Cawthron, of Hadlow, near Tunbridge, I am particularly indebted for the contribution of parasites, respecting which he has also obligingly supplied me with several interesting particulars. In his communication of the 26th of March he says:—"I enclose for your inspection specimens of the *Strongylus* class of worms. I found them in the fæces of a colt two years old, in company with examples of the *Oxyurus* and *Ascaris lumbricoides*. All of these parasites except the specimens sent have yielded to medical agents. The entozoa in question are most obstinate, and although I have tried all kinds of anthelmintics (especially turpentine in large quantities) the poor patient is wasting away daily." Mr. Cawthron adds—and this, perhaps, is the most curious and interesting part of his letter—that he had never before encountered worms of this description in "cysts or bladders," such as he now forwarded for my examination.

Owing to pressure of occupation for several days following the date of the receipt of Mr. Cawthron's communication, I had only time to take a rapid glance at the "strongles," and, by way of acknowledgment, to offer the opinion that they were referable to the species termed *S. tetracanthus*. On subsequent investigation, however, I have satisfied myself that the worms in question are neither more nor less than examples of my previously described *Trichonema arcuata*. They are in a further stage of development, but still without sexual organs. Even now I am not prepared to say that these worms may not turn out to hold some genetic relations with the four-spined strongles; but in the want of the cruciately-disposed oral papillæ, together with the absence of other equally characteristic marks of the adult *Strongylus tetracanthus*, I cannot do otherwise than provisionally maintain the distinctiveness of *Trichonema arcuata*.

Most interesting is it to find nematodes of this kind lodged in what Mr. Cawthron not unnaturally terms "cysts." He has sent me no less than forty of these little bodies. Most of them are more or less rounded, resembling rather small pills, and each tiny ball, as he himself remarks, "contains a worm" coiled up in the interior. The bright, blood-red colour of these worms contrasts strongly with their dark brown capsules, and when they are set free they at once remind one of the four-spined strongles, which are also of the same bright red hue.

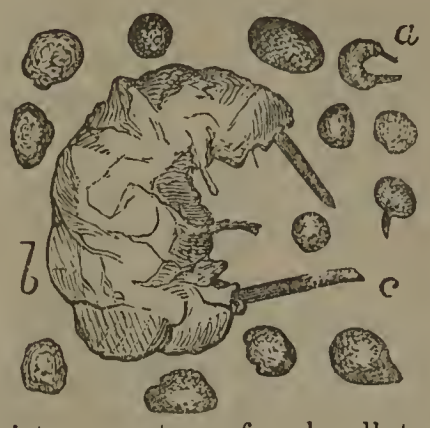
The further examination of these worms has led me to doubt if my previous determination of the sexual differences (which I believed were indicated in a rudimentary condition in the worms transmitted by Professor Williams) were correct. At all events, none of Mr. Cawthron's specimens display any certain evidence of sexual differentiation. On the other hand, the condition of the digestive apparatus indicates a clear advance in the degree of organisation.

In regard to the cysts themselves, I have ascertained with certainty that they are principally constructed of vegetable *débris*. Under the half-inch objective I recognised several common types of parenchymatous tissue (muriform and polygonal cells, woody fibres, and spiral vessels), besides crystalline particles, apparently raphides, and numerous chlorophyll granules. These were embedded in a dark brown coloured matrix, from the external surface of which some of the projecting vegetable hairs and fibres could readily be seen with the naked eye. The internal cavity formed, as it were, an accurate cast of the body of the enclosed worm.

In regard to the anatomy of the parasite I do not now propose to add further minute details; but I may observe that in the first specimen examined I noticed minute oval prominences, which seemed to confirm my previous suspicion that we had here to deal with examples of the four-spined strongle. These prominences evaded my search in other specimens. The buccal cup, œsophageal bulb, and intestinal tube were well formed, some of the large gastric cells displaying central nuclei. I took all of the worms to be immature females, but I failed to discover any trace either of the uterus or reproductive outlet. What most struck me in connection with the pellet which I have here roughly figured was an appearance of incomplete ecdysis in connection with the caudal end of the projecting worm. The appearance of a sheath-like envelope enclosing the extremity of the tail (*c*) led me to believe that the worm in question was in the very act of completing its first change of skin. Be this as it may, I did not find any independent skin-casts in the cavities of such other pellets as I had opened for the purpose.

If it be asked in what especial particular lies the value of Mr. Cawthron's interesting 'find,' I should not hesitate to say that it has to do with these cyst-like formations of vegetable and fæcal matter. They are far too large and coarse to be associated with the incrustation masses so often seen attached to the anal orifice of the palisade worm and certain other forms of strongle; moreover, the size of the particles of the *débris* are much too large to have passed through

the digestive organs of the worms themselves. Clearly they are formations which each parasite has in some way or other



Representation of thirteen cysts or fæcal pellets, one of which (*a*) has been enlarged (*b*) to show the head and tail of the worm projecting from the interior.

constructed for itself, the purpose of the capsule being probably to serve as a temporary lodging during larval growth, accomplished with or without one or more changes of skin. Such, in brief, is my own interpretation of the facts; and, if my surmise should ultimately prove to be correct, we have thus added another link to the chain of evidence which will explain the habits of *Trichonema arcuata*. Hitherto we have only become acquainted with this worm in the condition of a wandering sexually immature entozoon, whose origin and destiny are entirely unknown. Now, as a first step towards our knowledge of the further development of the creature, we have ascertained from Mr. Cawthron's 'find' that the same young worm not only escapes from its prison in the intestinal walls, but that it sooner or later proceeds to encyst itself in a pellet of fæcal *débris*. In this new situation we have indications both of external and internal structural alterations, as resulting from this change of residence, and the next point will be to ascertain what further changes are undergone by the worm either within or exterior to the body of the equine host. The solution of this problem may turn out to be one of the highest practical moment.

In the mean time, Mr. Cawthron's observations tend to show that, let the parasite's genetic relations be what they may, the worm, in the stage already known to us, is capable of producing grave symptoms in the horse. We have thus, on the whole, obtained a general confirmation of the original statements put forth by the late Professor Dick, and, at the same time, it has been rendered tolerably certain, as Professor Williams's independent evidence already went far to prove, that a gradual and even fatal emaciation may result from invasions by this comparatively minute entozoon.

ATROPHY OF THE LIVER ASSOCIATED WITH DILATATION AND IMPACTION OF THE BILIARY DUCTS WITH SAND AND OTHER EARTHY MATTERS.

By J. Wortley Axe, Assistant-Professor in the Royal Veterinary College.

A short time since I received from a gentleman in the north of England the liver and a portion of the diaphragm of an aged draught-mare, which had been destroyed, as was reported, in consequence of blindness and general incapacity for work. Viewed externally the liver presented a most unusual form or appearance. It was not only much smaller than natural, but exhibited on its surfaces several remarkably ovoid round projections and elongated ridges, which branched off into smaller ridges upon the middle and left lobe in particular.

The hepatic substance was of a pale yellow colour, excepting at the right extremity of the gland, where the usual deep chocolate hue and natural firmness were present. The left and middle lobes were soft and somewhat greasy to the touch. They broke with a marked granular fracture. On passing the finger over the surface, hard lines of various sizes were distinctly to be felt, radiating chiefly from the centre towards the circumference. The enlarged ridges ran in all directions, and mapped out the surface of the liver into small irregular patches. The enlargements varied in size from that of a walnut to that of an ordinary wine-bottle. Externally they were pale in colour, and apparently composed of dense fibrous tissue. To the touch they offered a hard but slightly yielding sensation; and when pressed heavily, they imparted a harsh-grating sound, the impress of the finger remaining as a small pit. The largest of these ridges occupied the transverse fissure of the liver, and had an appearance not very unlike a largely dilated gall-bladder. This similarity was the more apparent when taken in association with the common bile-duct, which was dilated to an extent equal in circumference to that of an ordinary sized hen's egg.

On section all the projecting masses were found to consist of bile-ducts filled to repletion *with bile-stained sand, small pebbles, and other earthy matter*. The walls of the ducts were much thickened and indurated, and in parts corresponding to the principal projections, were also largely

sacculated. The opening of the common bile-duct into the duodenum contained a small quantity of ingesta ; but beyond this the earthy matters extended into all the larger bile-ducts and their ramifications, especially those of the left and middle lobes ; those of the right lobe contained relatively only a very small quantity of the same material. The liver, with its earthy contents, weighed fifteen pounds and seven ounces, being in the proportion of nine pounds of the former to six pounds and seven ounces of the latter.

This case suggests important considerations of a physiological as well as of a pathological nature. That the sand was introduced from without, accidentally, either through the medium of the food or by the gratification of a morbid appetite, can hardly be questioned. It is by no means uncommon to find large quantities of earthy matter in the alimentary canal of sheep, especially when they are being fed on turnips grown on sandy soils, or otherwise when suffering from the presence of intestinal worms. In such cases as these we recognise in the existence of the parasites a substantial cause of the morbid desire for matters otherwise obnoxious to the natural instinct of the animals. However, when this morbid appetite is indulged in, the earthy matter passes through the intestinal canal, and is ejected with the fæces.

What may have been the precise nature of the cause which determined the passage of the earthy material into the common bile-duct, to the exclusion of all other kinds of matter, is a difficult problem to solve. The nature of the pathological changes consequent thereon is easily understood. Doubtless the thickening, induration, and dilatation of the hepatic ducts resulted from the continued irritation induced by the presence of a small quantity of sand originally, and to its gradual accumulation. The atrophied condition of the liver was also clearly due to the operation of two distinct causes: 1st, to the pressure of the large cyst-like dilation, which was situated in the transverse fissure pressing upon the hepatic artery ; and 2ndly, to the pressure exerted upon the general structure of the organ by the distended biliary vessels. The incapacity for work which led to the animal being destroyed was most likely the consequence of emaciation arising from defective nutrition, the result of impaired digestion and assimilation. Indeed, it is difficult to understand how an animal could survive under such circumstances.

It is much to be regretted that we are entirely without information as to other symptoms, excepting general emaciation, which were present. They might possibly have thrown some light on the nature of this remarkable case.

ON PURPURA HÆMORRHAGICA.

By A. H. Santy, M.R.C.V.S., Norwich.

The following notes of two cases of purpura hæmorrhagica may not be altogether devoid of interest, inasmuch as the varying symptoms which were manifested during the progress of the disease seemed to me to indicate the primary importance of directing particular attention to the state of the bowels, whatever *special* mode of treatment might otherwise be adopted.

Case 1.—A chestnut filly, four years of age, had an attack of influenza on the 25th of June, 1873, during the course of which I attended her; she was discharged as being convalescent on the 8th of July.

On the 15th of the same month I was again called in to examine her, when I found all the characteristic symptoms of purpura hæmorrhagica distinctly developed. Swelling in all four legs, especially around the joints, terminating superiorly by an abrupt margin; petechial spots on the mucous membrane of the nostrils, from which was oozing a sero-sanguineous discharge. Appetite very much impaired; pulse 64; respirations 25 per minute.

Treatment.—A draught was given composed of Spt. Æth. Nit. ʒj, Ol. Terebin. ʒj, Ol. Lini ʒvj. The swellings were bathed with a simple cooling astringent lotion; the diet consisted chiefly of gruel.

16th.—The swellings had considerably increased; there was also irritation of the urinary organs; the previous symptoms remained.

Treatment.—Ordered Spt. Æth. Nit. ʒj, Spt. Ammon. Arom. ʒj, with gruel, during the day.

17th.—Animal getting weaker. Put her in slings, and gave Potass. Iod. ʒj, in solution, twice a day, having seen that medicine highly spoken of in this disease. I also ordered a couple of eggs to be added to the gruel *three* times a day.

18th.—Symptoms similar; same treatment continued.

19th.—Animal looking worse; appetite completely gone; discontinued Pot. Iod. Continued gruel and eggs, to which I now added about a pint of beer three times a day.

20th.—Appetite returned; the mare was looking much better; continued gruel, &c. During the day she had looked eagerly for some food, and had eaten a fair quantity of hay which had been given her.

At 6 p.m., however, she began to manifest symptoms of pain, pawing with the fore feet, and appearing anxious to lie down. Being so weak, and her legs so much swollen, it would have been impossible for her to have got up again without assistance, so we allowed the slings to remain under her, simply lowering her down when she wished, and hoisting her up again when she manifested a desire to rise. As she did not remain at ease in either position for more than about fifteen minutes at a time, this mode of alteration of position was continued during the whole time that the pain lasted, which was until noon of the following day, a period of eighteen hours. The following draught was also administered :—Tinct. Opii ℥j, Ol. Lini ℥viij ; warm-water injections at short intervals were also employed.

I repeated the above draught at 11 p.m., about an hour after which the mare broke out in a profuse sweat, during which the swellings rapidly disappeared, and the pain abated.

At 3 a.m. (21st) she became quite cold ; the pulse was imperceptible, and every appearance of early dissolution existed. I at once administered a large dose of whisky, and clothed her up as well as possible. She revived a little after the exhibition of the stimulant, but the pain continued until 12 noon, when it began to abate, and towards evening diarrhœa commenced, which seemed to relieve her. She had small doses of Spt. Ammon. Arom. in a little beer, at intervals during the day, the gruel, &c., being suspended.

22nd.—She looked much better this morning; but the swellings returned almost as large as before. She seemed anxious for food. Gave her a little dry bran, and repeated the gruel and beer, minus the eggs.

23rd.—She appeared quite hungry, but would take no *sloppy* food ; ordered her a little dry bran and chaff, and the gruel, &c., as before.

24th.—The mare ate ravenously of any dry food which was given her ; she consumed a considerable quantity of hay during the day. Gruel, &c., as previously.

In the evening she had another attack exactly similar to the first one, and for which she was similarly treated, only, getting a larger dose of Ol. Lini to commence with, the violent symptoms again passing away as the bowels became freely opened. I now withdrew all solid food from her for several days, and gave her nothing but gruel made of linseed and oatmeal, with three pints of beer a day.

On the 29th I took her out of the slings, and very carefully commenced giving her a little solid food, withdrawing the beer,

&c., but continuing large doses of linseed for some days to keep the bowels regular. From this date she continued gradually to improve, and, with the exception of soreness in the places where the swellings had burst, went on quite satisfactorily, and was discharged on the 12th of August.

Case 2.—A chestnut horse, six years of age, had been under treatment for influenza, from which he seemed to be recovering, when, on calling to see him on the morning of the 2nd of November, I was somewhat surprised to find him standing, breathing very hurriedly, with a pulse of 70 per minute. Legs, head, and chest were covered with large patches of swellings, from which a sero-sanguinous discharge oozed; the same kind of discharge also issued from the nostrils. The symptoms in this case developed themselves much more rapidly than in the other.

Treatment.—I at once administered Ol. Tereb. ʒj, Ol. Lini ʒviij, and had the horse placed in slings. The swellings were bathed with a simple cooling lotion, and gruel was given three times a day.

November 3rd.—No improvement; swellings increased, especially on the chest and abdomen. Repeated the Ol. Lini and Ol. Tereb. in the same proportions, and ordered eggs be added to the gruel, &c.

4th.—Swellings very much increased; bowels a little costive. Gave Ol. Lini ʒxij, Ol. Tereb. ʒss.

5th, 6th, and 7th.—Little alteration; swellings increased about the head and flanks; scarified the latter. Continued other treatment, varying the quantity of Ol. Lini according to the state of the bowels.

8th.—Swellings considerably diminished; entirely gone from the head.

9th.—Appetite returned; takes gruel of his own accord; looking more lively; swellings still diminishing. Discontinued Ol. Tereb., and as the horse was partaking of a considerable quantity of linseed gruel, withheld the Ol. Lini.

10th.—Animal looking uneasy, shifting his legs, and manifesting acute pain in the near hind one; bowels a little costive; swellings returned as large as ever. Took him out of the slings, thinking to ease him a little, but found him unable to move; replaced him again, and administered Ol. Lini ʒxiij, and threw up injections at intervals during the day. Continued beer and a little gruel, which the horse drank readily.

11th.—The animal was a little easier; bowels still costive. Gave Ol. Lini ʒviij. Took him out of the slings for a short time again to-day. Continued gruel and beer, &c.

12th and 13th.—Appetite much improved; bowels regular. Continued Ol. Lini in ℥viij doses, taking him a few hours out of the slings daily.

From this date the horse gradually recovered, and as he now began to take any amount of linseed gruel, the Ol. Lini was gradually withdrawn.

16th.—I discontinued the use of the slings entirely, and ordered walking exercise; the swellings had disappeared. The beer and eggs were suspended, as he began to take solid food.

28th.—Animal seems convalescent. There was a little diffused swelling in the hind legs, and one or two sores remaining, but otherwise he was apparently well.

I may remark that in both these cases the pulse averaged between 60 and 70 per minute during the whole course of the disease, except during the paroxysms, when it was considerably increased.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from p.* 159.)

In the Erical Alliance, which follows next in order, we have brought together several natural orders of most curious and interesting plants, most of which have from time to time been celebrated for some virtue, but few of which now find a place in the "family herbal," much less in the Pharmacopœia, and yet we have only to name the heaths and the epacrids to conjure up to the mind of the florist some of the most beautiful gems of his house; but, besides these, the botanist is equally interested in a few species of rare and curious native plants belonging to the alliance, some of which must receive a passing notice in this place.

The natural orders brought together by Dr. Lindley in the alliance are six, but we shall only shortly describe four of these; they are as follows:

1. *Epacridaceæ*—Epacrids.
2. *Pyrolaceæ*—Winter Greens.
3. *Monotropaceæ*—Fir Rapes.
4. *Ericaceæ*—Heaths.

1. The epacrids are only known to our greenhouses. Of these Dr. Lindley says:

"They are all natives of the Indian Archipelago or Aus-

tralasia or Polynesia, where they abound as heaths do at the Cape of Good Hope.

It is remarkable that only one or two heathworts are found in the countries occupied by epacrids.

The species are chiefly remarkable for the great beauty of their flowers and the singular structure of their leaves. All the fruits of the berry-bearing section, especially those of Lisanthesapida, are esculent; but the seeds are too large and the pulpy covering too thin to render them very available for food. *Astroloma humifusum*, the Tasmanian cranberry, is found all over that colony. It has a fruit of a green or whitish colour, sometimes slightly red, about the size of a black currant, consisting of a viscid apple-flavoured pulp, enclosing a large seed. This fruit grows singly on the trailing stems of the plant, which resembles juniper, bearing beautiful scarlet blossoms in winter. The fruit of *Staphelia adscendens*, a small prostrate shrub, resembles in appearance and character that of *Astroloma humifusa*. *Leucopogon Richei*, called native currant, is a large, dense shrub, growing on the sea-coast, and attaining to a height of from four to seven feet. The berries are small, white, and of a herby flavour.

In D. Entrecasteaux's voyage in search of La Perouse, a French naturalist named Riche was lost for three days on the south coast of New Holland, and supported himself principally upon the berries of this plant, in commemoration of which circumstance it has received its specific name.*

It will be seen, then, that though the epacrids possess properties allying them with some of the Ericads, yet none of these are of sufficient importance to cause the plants belonging to the order to be cultivated for any other purpose but as an elegantly-formed and pleasing flowering greenhouse shrub.

2. The *Pyrolaceæ* are represented by some rare and interesting English species, among which we have gathered the *Pyrola media* and *P. minor*, in Wyre Forest, Worcestershire, where, with our friend Lees, we were led into the fastnesses of this finely-wooded forest by the veteran Jordan.

We have found the *P. minor* in Oakley Park, Cirencester, beneath a clump of Scotch firs; but it is at all times only very local in its appearances, and as, probably, there may not be another locality for many miles, it becomes a curious problem how a plant becomes established in the deep solitude

* 'The Vegetable Kingdom,' pp. 448-9.

of old plantations—for, after all, the trees were planted—of beech and fir.

There was a time when the leaves of these plants were held in great repute for wounds and hurts of various kinds, and probably its persistent green leaves, from which it gets the name of "winter green," recommended it for dressings to wounds at a time when any green leaf was considered as a vulnerary.

3. The *Monotropaceæ* or fir rapes may, perhaps, be considered as semi-parasitic plants, which, as not possessing true leaves, are connected with the winter greens by a curious leafless species of Pyrola—*P. aphylla.*

The fir rapes, as represented by our single British species of *Monotropa hypopithys*, form an exceedingly curious order. Dr. Syme says of our species, "This plant has much the aspect of the parasitical genus Orobanche (except in the structure of the flowers). Its pale colour and absence of leaves give a presumption that it is parasitical, which is strengthened by the plant growing generally under particular trees. Against this presumption it may be said that no connection has been traced between the roots of the Monotropa and that of the trees beneath which it is found; but this negative evidence is very far from conclusive, though, as Mr. Newman suggests, the plant may derive its nourishment from decaying, and not from living vegetable matter, in the same way in which fungi do, for which green leaves would not be necessary."

We have taken great pains to ascertain the fact connected with parasitism of this plant, but never succeeded in tracing a union with its roots or stem and that of a foster parent; but the semi-decayed leaves and roots surrounding the whole seem to favour Mr. Newman's view. In the Cotteswold beech woods it is very abundant beneath the trees, and its brown leafless floral racemes have a peculiar aspect.

Lindley says that "in Germany the powder of *Monotropa hypopithys* is given to sheep when attacked by cough;" but we can see no reason for this preference, and at present we must view these fir rapes as curious plants and nothing more; still their spread beneath the shade of beech and fir is not a little remarkable, inasmuch as, in our own observation, this spread seems more rapid and more complete in old plantations than in aboriginal wood.

4. The *Ericaceæ*, or heaths, from the typica lgenus named, will be seen to contain some of the most beautiful and interesting examples of the vegetable kingdom. Even if our consideration be confined to our own native examples of the

genus Erica and its allies we could only conclude that the order is one of the highest interest. But if the very large list of the genera of the natural order be but glanced at it will show forth a blaze of beauty which can hardly be surpassed by any other order of plants; take, for example, such names as, besides proper heaths, Rhododendron, Azalea, Arbutus, Andromeda.

We will now direct attention to our British species of heaths proper, consisting of Erica and Calluna. Curiously enough, the latter genus is by us in England considered as the representative of the heath, and its common name of heather is significant upon this point. This plant is one of the commonest in our country, as in England, Wales, Scotland, and Ireland, many hundreds of miles are occupied by this species—*Calluna vulgaris* or ling—and, indeed, such stretches of land are significantly termed *heaths*.

Heathworts, according to Lindley, are most abundant at the Cape of Good Hope, where immense tracts are covered with them; they are common in Europe and North and South America, both within and without the tropics, less common in Northern Asia and India, and almost unknown in Australasia, where their place is supplied by Epacrids. Although found in tropical countries, as, for example, Java, it is only on their highlands.

Still, notwithstanding that the order is represented by about fifty genera and as many as 900 species, many of which possess active properties, none of them have a permanent place in our pharmacopœias, and very few of them find favour with the herbalist. The *Arbutus uva ursi*, Linn., has, perhaps, been more employed in medicine than all the other species put together, and it would seem that even this is of very uncertain action. The 'Flora Medica' says its "leaves are astringent and rather bitter. Used in nephritic and calculus cases; of very doubtful action in the latter, but believed to be a decided palliative in nephritic paroxysms."

Our native heaths are well known as a favourite food of grouse and other birds, but it is said that sheep and cattle feeding upon it often become injured; but there seems reason to believe that the nature of the soil and climate have as much to do with the matter as the heath so called—*heaths* and *moors* not being healthy situations for animals at the best of times.

The heath is much used with us for making brooms, and it is to its store of vegetable matter in part that very many of our countrymen are indebted for their fuel.

That the kahlmias, azaleas, rhododendrons, and others of

this showy section of the order possess active narcotic principles there can be no doubt; in the 'Flora Medica' before quoted, we find the following remarks:

"Dioscorides asserted that the honey collected about the Heraclea, in Pontus, produced alienation of mind with profuse perspiration; and it has been believed that the pestilence which attacked the soldiers of Xenophon in the famous retreat of the 10,000 was caused by the quantity of this honey then eaten. Tournefort ascribed the poison to the flowers of *Rhododendron ponticum* and *Azalea pontica*. But Pallas is of opinion that the latter alone was the cause. He says that the effects of the Euxine honey are like those of the *Lolium temulentum*, and occur in a country where no Rhododendron grows.

The natives are well aware of the deleterious qualities of the plant, and it is related that goats which browse on the leaves, before the pastures are green, suffer in consequence, and, moreover, that cattle and sheep perish."*

Though this passage is somewhat confused, and though the reference to the *Lolium temulentum* is probably founded on mistaken views, we can yet believe that many of the order would be found to reward research and experiment, and if the medical uses of the Ericaceæ could be made to keep pace with their floral beauties it would be one of the most useful, as it certainly is one of the most beautiful and interesting, of all the natural orders of plants.

REMARKS ON VERTIGO (MEGRIMS).

By Thomas Paton, V.S., Army Service Corps.

Mr. Murray, in his interesting article on Vertigo in the January number of the *Veterinarian*, suggests that all the authorities he has consulted have failed to advance a satisfactory cause for the state popularly known as "megrims," in which term are included all the outward and visible signs symptomatic (as I believe) of that pathological change in the structure of the cardiac muscular fibres resulting from fatty degeneration, a process of wasting disintegration, in which the true sarcous elements disappear to a greater or less extent, and are replaced by elaine, rendering the heart pale, yellow, greasy, flabby, and incapable at times of propelling

* 'Flora Medica,' p. 379.

the required amount of arterial blood to the brain ; hence the syncope, from which the recumbent position and diminished blood pressure enables the horse so speedily to recover.

Notwithstanding this serious and incurable condition of the heart, such animals, owing to their being endowed with an exalted degree of nerve force, are often capable of performing a good day's work, and will occasionally exert themselves so much as to rupture the left ventricle, rendered fragile by the condition before alluded to ; one instance of this kind came under my notice during the Autumn Manœuvres of 1871.

That vertigo is not due to congestion appears clear from the fact of the rapid recovery which horses make from the state of syncope and hyperæmia of the cerebral vessels would be longer in duration ; seeing also that a congestion producing such grave results could scarcely decline so rapidly and completely ; nor do I think it possible that the restoration of congested vessels producing syncope could be other than a slow process. Though I am far from offering my opinion as a final solution of the question, it appears to me so reasonable an explanation, especially as it is supported by analogy with the experience of human surgeons, that I would claim for it the *first place* until a better theory presents itself. The "mechanical causes" are accepted by so many eminent veterinarians as to entitle them to respectful consideration ; with regard to which, however, Mr. Murray's experiment of ligaturing the jugulars puts out of court the theory of pressure on those vessels being the sole cause. Yet his experiment cannot be deemed conclusive, inasmuch as the collateral circulation sustained its share of the general pressure (damming back the blood) in the cases of horses falling in the collar, but was free to maintain the circulation in the experiment. Similar objections apply to the ligaturing of the carotids, the vertebrals being competent.

I do not wish to be understood as having relinquished the pressure theory, because I firmly believe that a more complete obstruction to the supply of arterial to, and return of venous blood from, the cerebrum produced by collar pressure, is quite sufficient to account for many of the cases.

That mere increase of temperature *per se* affects the issue in any way, beyond the fact that people travel more and farther, and exact more work on long days, is inconsistent with my ten years' experience in the Cape, where I never saw a case of megrims. The harness horses there never wear collars, but are driven in breast straps, in which they fre-

quently travel fifty or sixty miles a day, with the temperature above 100° F. in the sun.

Nor does pressure on the trachea seem to produce syncope, as the practice of yoking teems of oxen to the wagons is such as to leave them the option of drawing true and fairly by the neck, or pressing the trachea against a stout cord passing from one yoke stay (skive) to the other, which a rogue or half-trained ox will frequently do until he roars and blows with the inconvenience; but which never produces syncope.

Pressure on the posterior cervical ganglion would doubtless produce syncope; but its topography places it beyond consideration, except under very peculiar and rare circumstances.

Of course there are many other causes of vertigo, notably dyspepsia, exhausting and blood-contaminating diseases, or bad conditions of hygiene; but as an honest searcher after truth I should be glad to hear the opinions of some of your correspondents, as we army men generally lose sight of our old patients. Even our young horses, when they show signs of early decadence or slow asthenia, we *cast* and spare not.

Pathological Contributions.

CATTLE PLAGUE.

It is stated that five fresh outbreaks of cattle plague have occurred in Galicia in different places. The disease also continues in Lower Austria, Carniola, Buckowina, and Dalmatia. Outbreaks have likewise occurred in Croatia, Salonica, and the Military frontier; and in Poland at Petrikan, Radmsk, and in the Government of Lublin. Cattle plague is prevalent in Polish-Russia, at Todolszun and Gauvolin.

The disease still exists in the Island of Naxos. Accounts from Salonica state that the severity of the disease is somewhat mitigated; several districts have, however, suffered severely from its ravages. A British subject, a farmer, has lost twenty-nine out of thirty-five cattle, and in a small village sixteen miles from Salonica, fifty-three carcases were observed lying about the pastures.

Cattle plague is stated to have ceased in Hungary; no cases have been reported for three weeks.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of February, 1874, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Oporto . .	London .	Foot-and-Mouth	326	...	...	...	326	326
„	Southampton . .	„	20	...	...	...	20	20
Total.			346	...	...	...	346	346

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 12th March, 1874."

FOOT-AND-MOUTH DISEASE.

THIS disease continues very prevalent in and around Lisbon; each cargo arriving from that port bringing diseased animals. The disease, however, does not appear to have spread all over the country. The cattle imported from the north of Spain are also apparently free from foot-and-mouth disease.

In this country foot-and-mouth disease continues to spread; but, up to the present, it has not, except in a few cases, assumed a malignant type.

BLOOD-POISONING EXPERIMENTS.

(*Continued from p.* 88.)

Jan. 24th, 1 p.m.—Inoculated a guinea-pig (No. 1) with blood from a hæmorrhagic clot found beneath the endocardium of an ox, which died from *Splenic Apoplexy*, one puncture on the inner part of each thigh. The blood was previously examined and found to contain large numbers of bacteridies.

Guinea-pig found dead on the morning of the 27th, no premonitory symptoms of ill-health having been observed.

Blood contained bacteridies in abundance.

Jan. 27th, 9.30 p.m.—Inoculated a guinea-pig (No. 2) one puncture on the inner part of each thigh with blood from guinea-pig (No. 1). Animal found dead on the morning of the 29th. Blood examined after death; contained bacteridies.

Feb. 3rd, 12 p.m.—Inoculated rabbit (No. 1) with blood from guinea-pig (No. 2) which died January 29th. Rabbit died very suddenly on the following day at 1 p.m. Blood contained a very large number of bacteridies.

4th, 3.45 p.m.—Inoculated a second rabbit with blood of guinea-pig (No. 2) diluted with eight parts of water. *Negative result.*

4th.—Inoculated a small terrier dog with blood of rabbit (No. 1), two punctures.

5th.—Animal exhibits indication of pain and stiffness in inoculated limbs.

6th, 11 a.m.—Refuses food; is dull and restless. Both limbs stiff and sore.

4 p.m.—Still refuses food. Is constantly recumbent and much dispirited. Can scarcely be made to move.

7th, 6.30 a.m.—Greatly prostrated. 8.30 a.m.—Died. No bacteridies were detected in the blood; nor were any structural changes observed in any part of the body sufficient to account for death.

9th, 4 p.m.—Inoculated guinea-pig (No. 3) with blood from the dog, one puncture on inner part of each thigh. *Negative result.*

9th, 4 p.m.—Inoculated guinea-pig (No. 4) with blood from guinea-pig (No. 2) which died January 29th (blood eleven days old). Animal died 8.30 a.m. on the 11th.

14th.—Inoculated guinea-pig (No. 5) also with blood of guinea-pig (No. 2), blood fifteen days old. Guinea-pig died during the following night.

Facts and Observations.

Trichinosis.—At the town of Forst, in Germany, twenty-two persons have been attacked with trichinosis through eating the flesh of a pig killed by an hotel keeper. The cook and the hotel keeper have both died; the body of the former was found full of living trichinæ. Several other persons were, on February 24, dangerously ill, and new cases were coming under notice.—*London Medical Record.*

Worms in the Heart of a Dog.—Amongst the various specimens of parasites recently received by Dr. Cobbold of the Royal Veterinary College is an interesting preparation of hæmatozoa sent by Dr. W. Wykeham Myers from Chetat, North China. The worms in question appear to be of the same species (*Filaria immitis*) as those which are already known to give rise to a fatal disorder amongst Chinese and Japanese dogs. In our next issue Professor Cobbold hopes to give some further particulars of the case communicated by Dr. Myers, and also to offer some original observations on the subject.

Professor Traube's Jubilee-—The occasion of forming the new Charité-Vereins, consisting of all the medical officers of the great Berlin Charité Hospital, was taken for giving Geh.-Med. Rath Professor Traube a jubilee banquet, on the occasion of his having completed his twenty-first year of service in that hospital. His clinical teaching there is, of course, of world-wide celebrity, and he, together with Professor Reinhardt and Virchow, founded the new Berlin School of Minute Pathological Anatomy. The dinner was largely attended, and the speech of Professor Virchow seems to have been one of extraordinary power, completely carrying the audience away with it.

Transformation of Bacteria into Microzymes and of Microzymes into Bacteria, in the Alimentary Canal of Animals. By A. Béchamp and A. Esvor (*Compt. rend.*, lxxvi, 1143—1145).—In the stomach of the dog, during digestion, microzymes are found, and various forms of bacteria. Beyond the pylorus, nothing but microzymes are met with till the ileo-cœcal valve is reached. In the large intestine bacteria are abundant. If, however, there be in the small intestine any cause of irritation, as for example a tapeworm, microzymes are immediately developed into bacteria.

So-called Zinc-caps for Bottles, Flasks, &c. By G. C. Wittstein (*Dingl. Polyt. J.*, ccviii, 341).—These are so greatly contaminated with lead that their composition in many cases would be most correctly expressed in saying that they consisted of lead containing zinc rather than the reverse. The amounts of lead in caps covering champagne, liqueur, mustard, mineral water and beer flasks, were respectively 90·13, 91·33, 92·4, 93·1, 94·2, per cent. The danger is particularly great in the case of flasks containing liquids with free acids present, as if they are not completely emptied at once, and the cap replaced while a portion of the liquor remains, a drop or two of the slightly acid fluid is liable to come in contact therewith, and on standing to act upon the lead, bringing a portion into solution. The drop or two of lead solution on the cap is thus likely to be carried into the stomach of the next drinker from this flask. Cases of acute lead poisoning have thus been occasioned. The author has also detected lead largely present in tin-foil used to wrap cheese in.

Lime-water in Stings of Bees or Wasps.—M. Dauverne states as the result of numerous trials that the pain and suffering caused by these may be immediately assuaged by the application of lime-water—a remedy which may always be prepared at once by the aid of a little quick-lime and a glass of water.—*Union Méd.*, October 25.

Influence of the Smoke from the Freiberg Works upon the neighbouring Vegetation and the Health of Domestic Animals. By Dr. Frectag (*Dingl. Polyt. J.*, ccviii, 235).—1. Sulphurous, sulphuric, and arsenic acids and zinc salts contained in the smoke and fumes condense with the dew on the leaves, or come in contact witn the bedewed leaves; and on evaporation of the moisture a more concentrated corrosive residue is left, which quickly decomposes and kills these leaves, and so vegetation is rapidly extinguished. Chemical analysis and observations of the appearance of the vegetation readily detect the presence and effect of these deleterious substances. Poisoning of the soil or of the entire plant is out of the question. The metallic oxides and salts adhering to the leaves of ths fodder may be dangerous to animal organisms, in causing inflammations and corrosion of the mucous membrane of the digestive organs, and under very unfavorable circumstances even death itself. This fact may always be established by dissection and chemical analysis.

THE VETERINARIAN, APRIL 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

CATTLE INSPECTION AND THE POLICE.

A WRITER in the *Agricultural Gazette* of March 7th, under the signature S. W., thus refers to the appointment of policemen as inspectors of cattle:

"Fifteen young stock, belonging to Mr. Rush, of Babraham, in the autumn of 1871, were declared to be suffering from pleuro-pneumonia, and were placed under surveillance of the police cattle inspector of the district, who summoned Mr. Rush to appear before the magistrates for neglecting to give information; and this police cattle inspector had the audacity to take proceedings without having a single carcase of the five beasts which had died examined by a veterinary surgeon. I was requested by Mr. Rush to examine the ten surviving beasts, and found them affected with bronchial parasites, and not pleuro-pneumonia. The police inspector showed his better sense by withdrawing from the prosecution; but, strange to say, after the lapse of three weeks, and after the true nature of the malady had been declared, Admiral Davis, chief constable of the Cambridgeshire constabulary, also chief inspector for the county, reported at the Cambridge Quarter Session that Mr. Rush's premises continued to be pleuro-pneumonia-infected. It would be very interesting to learn from Dr. Williams the way in which the last tabular form referring to Mr. Rush's cattle was filled in. The Veterinary Department of the Privy Council has been very exacting with veterinary inspectors as to filling in this last form when any infectious disease has disappeared from premises. Every class of animal on the premises when disease broke out had to be numbered, and at the determination all had to be accounted for (number died, slaughtered, recovered), with the nature of the disease affecting the cattle. Mr. Rush's surviving ten cattle were placed under the treatment of Mr. H. Fuller, veterinary surgeon, March, Cambridgeshire. Mr. Fuller's first act was to have one carcase of the buried ani-

mals removed from its grave for *post-mortem* examination, and it was found that the bronchial tubes were literally choked with dead worms. Mr. Fuller's treatment of the ten young cattle was singularly successful—all rapidly recovered. Another lot of twelve young cattle in an adjoining district, affected with bronchial parasites, had the strong hand of the police cattle inspector placed upon them. Mr. Harris, of Sawbridgeworth, was consulted in this case, under whose treatment all the affected cattle rapidly recovered. And is it surprising, with such instances as the foregoing of the incapacity of policemen as cattle inspectors, that the stockowner should refuse to act cordially with Government in carrying out the meaning of the Contagious Diseases (Animals) Act? Whilst local authorities continue to have the power of appointing men as cattle inspectors so incapable as policemen, the British stockmaster will continue to feel that the veterinary department of the Privy Council is not doing its duty in an efficient manner."—*S. W.*

We could add other instances to those adduced by S. W. to prove the incapacity of the men who hold the appointment of inspectors all over the country; incapacity which cannot, however, be urged to their discredit, as it is no more the duty of a policeman to perform veterinary functions than it is the office of a veterinary surgeon to do the work of the constabulary. But S. W. does not touch on the real cause of the difficulty. The veterinary department of the Privy Council has no power to regulate the appointment of veterinary inspectors by the local authority; that duty has been delegated to the authorities by Parliament, although it has been attempted several times to our knowledge—we may go so far as to say at our suggestion—to restrict the office of inspector to members of the Royal College of Veterinary Surgeons; the clause containing such restriction has always been struck out or amended before the Bill became law.

Stockowners do not take much trouble in the matter—certainly do not insist on the appointment of veterinary inspectors—indeed, as ratepayers they would rather be disposed to demur to the maintenance of a standing army of veterinary surgeons when no emergency exists to render their services indispensable.

The whole question is one of finance, as we have often endeavoured to show. It was found that the cost of inspection, when professional men were employed, was too considerable; and accordingly some local authority hit on the expedient of employing the police, making the chief constable also chief inspector. The example was followed, and in a few months the system was adopted in nearly all the counties of England. There is no question of the economy of the measure; its efficiency is shown by the cases quoted, and hundreds of a like kind which might be referred to.

Nevertheless, the constabulary might do good service as assistants to competent inspectors who should be appointed in each county in number according to the extent of the cattle population and the prevalence of disease. The duties of the veterinary surgeon would clearly be to determine the nature of disease in every case of an outbreak, and to advise from time to time as to the measures to be adopted for preventing the spread of the disease. The police would be properly employed in carrying into effect the provisions of the Act and Orders of Council. Under such a system the proceedings on Mr. Rush's case referred to by S. W. could not occur; at least ought not to happen, we should say, because it is impossible, it seems, to render an act of absurdity impossible. The terms of the 55th section of the Act are tolerably explicit, and we evidently intended to provide against hasty or incompetent action.

Reviews.

Quid sit pulchrum, quid turpe, quid utile, quid non.—Hor.

The Specific Action of Drugs on the Healthy System; an Index to their Therapeutic Value, as deduced from Experiments of Man and Animals. By Alexander G. Burness, M.B., C.M., Univ. Aberd., and F. J. Mavor, M.R.C.V.S. President Central Veterinary Society. London: Baillière, Tindall, and Cox, 20, King William Street, Strand. Paris: Baillière. Madrid: Bailly Baillière. 1874.

At a time when the sciences of physiology and pathology are far in advance of therapeutics, any attempt to throw light on the nature of medicinal action is to be welcomed. The authors of 'The Specific Action of Drugs' start with a theory or proposition respecting the nature of disease and the action of medicines which is thus expressed in the introduction:

"In the first chapter, a few examples are adduced to show that each disease is characterised by certain primary symptoms peculiar to itself, due in most cases to some, as yet, unknown cause, specifically influencing some special parts or tracts; and in the same chapter various examples are brought forward, showing that there are various known agents which influence primarily certain parts, and produce certain symptoms peculiar to each, when introduced into the healthy animal economy, and that this influence is due to their physical, chemical, or dynamical properties; whilst in the second chapter it is shown that the knowledge of the specific action of each substance thus gained is a *key* to its therapeutic value. And at the same time allusion is made to the fact that each substance exerts a two-fold action upon the same parts, according to the quantity taken, and the state of the part—one, its physiological action; another, which, for want of a better name, may be called its restorative action."

By way of illustrating the character of the two actions referred to, we may select the account of the action of aloes in physiological and restorative doses. At p. 46 we read:

"This drug belongs to the class of agents that produce endosmose of the serum of the blood, and hence purgation, when introduced into the alimentary canal; being but slowly absorbed, it passes through the stomach and small intestines,

its action being to a great extent confined to the large intestines and rectum, and owing to the resin in its composition it (in common with all resinous substances) exerts a topical influence on the absorbing surfaces, and by acting on the ganglionic system induces reflex action of the spinal cord; hence the tenesmus, griping, &c."

"When injected into a vein or applied to a blistered surface, it is absorbed, and eliminated by the bowels, aud in process of elimination, by its topical action, it induces purgation. That the griping and tenesmus is due to a great extent to the resin contained in this drug is evident from the fact that the watery extract does not produce this irritation, though still retaining the power of producing purgation. Many other drugs containing resin will be found to act in a milder manner when this resin is removed."

At p. 47 we are told that—

"This drug is indicated in dyspepsia with chronic constipation (especially if given in combination with sulphate of iron, or extract of nux vomica). Also useful in some forms of dysentery where there is tenesmus and a congested state of the pelvic viscera."

Thus, the agent is employed in restorative, that is to say, small doses—how minute we are not told—to correct the very derangements, purging, griping and tenesmus, which in full (physiological) doses it produces, and in like manner most of the drugs in ordinary use are referred to in the course of the work. At the end of the book several cases are given to illustrate what is meant by specific treatment of disease.

The extracts which we have given will convey some idea of the intention and scope of the work which contains much material for thought and experiment; especially does this remark apply to the chapter on temperature.

Extracts from British and Foreign Journals.

FARMERS' CLUB.

MILK: ITS SUPPLY AND ADULTERATION.

A Lecture by Dr. A. Voelcker.

At the monthly meeting of the Farmers' Club, held at the Salisbury Hotel, Fleet Street, on Monday evening, March 2nd, the

above subject was set down for discussion. *Mr. Major Lucas* presided. There was a good attendance.

The Chairman in adverting to the subject said it was a most important one, and would be introduced by Dr. Voelcker, than whom no man was more able to deal with it. Before the cattle plague visited these shores, the Metropolis was, to a very great extent, supplied with milk from cows kept in London itself; but since that time a large proportion of the milk supply came from the provinces. Good milk was as essential to the community at large as good bread and good beer. They knew that feeding stuffs and artificial manures were sometimes largely adulterated, but he believed that this observation would not apply to milk, which might be, and perhaps was, sometimes diluted but not mixed with deleterious matters. In giving place to Professor Voelcker, he expressed a wish that that gentleman would tell them of some method, such as the addition of a chemical agent that should not be deleterious to its quality or flavour, whereby they might ensure the transit from a distance to London of milk in a sound and sweet condition.

Professor Voelcker opened the discussion, and, referring to the Chairman's remarks, he said that the less chemistry had to do with milk the better. (Hear, hear.)

He then proceeded to read his paper.

All men share alike the opinion that an article of food of such universal and large consumption as that of milk should be delivered to the consumer in a perfectly wholesome condition, and of as good a quality as it can be procured, either from the country or from town-fed cows. Milk may be regarded as a kind of model food. It supplies all the various elements of nutrition which are required to build up the bony frame and muscular tissue of the young, and, at the same time, supplies materials for the support of respiration and keeping up the animal heat of the body. Undiluted with water, milk is both a readily digestible and valuable, if not indispensable, article of food for children. Breeders of high-priced shorthorns know full well how essential it is to the early development of a sound and strong frame, round which the flesh and fat may be afterwards deposited in symmetrical forms, not to stint the calf in milk; and hence breeders of pedigree stock not unfrequently keep cows as nurses, for the purpose of providing an extra quantity of milk for their calves. It is to be feared that the children of the artisan and the poor in towns and of the agricultural labourer in the country frequently are not nearly so well supplied with milk, both as regards quantity and quality, as the progeny of a well-cared for herd of shorthorns, or Ayrshire or Devon cows. Even the wealthier classes of a town population, not objecting to the payment of an additional 1d. or 2d. per pint, in the hope of being supplied with extra rich *nursery milk*, cannot always rely upon the unexceptionally good and rich quality of the milk which finds its way into the nursery. If it be remembered that the bodily health of the adult is affected in no small degree by the amount and quality of the food with which the infant from the time of its birth and throughout the

period of childhood is fed, and also that much physical suffering might unquestionably be prevented if the children of the poor were not stinted in a milk diet, it is doubly desirable that the scanty allowance of milk in which the children of the poor are generally indulged should be unadulterated and of the best quality that can be procured. We hail, therefore, with pleasure, the enforcement of the Food Adulteration Act, for there can be no question that before the Act came into practical operation the milk sold alike to rich and poor in London and other large towns was watered much more generally, and to a greater extent, than it is at present in places where public analysts keep a watch over the milkman. Every honest dealer in milk, if I am not mistaken, entertains the same feeling with regard to the intentions of this Act, and the measure of success with which it has been carried into practice; for it cannot be to the interest of the upright dealer to have to meet the competition of the unprincipled retailer who waters his milk in the barefaced manner so prevalent in London and other towns a few years ago. The honest dealer has nothing to fear from having the milk which he supplies examined; and a wholesome check upon milk adulteration is put by the infliction of a penalty imposed by the magistrates, still more by the publicity which is given to cases in which persons have been convicted of having sold adulterated milk. Nevertheless, the Food Adulteration Act, like some other Acts of Parliament which had to be amended before they could be carried out in practice to the manifest interest of the public at large, requires to be carefully scrutinised, and to be revised in not a few of its details, if it is not to defeat, in a great measure, the very object for which it was passed. In carrying out legislative measures of the nature of the Food Adulteration Act, you will agree with me that great care should be taken to make provisions which shall render it impossible to inflict undeserved injury upon the honest trader. Unfortunately purveyors of milk, in not a few instances, are placed at the mercy of men whose want of practical knowledge of the various circumstances which affect the quality of milk is well matched by their inexperience and want of skill in conducting chemical operations. Numerous recent trials afford convincing proofs of the fact that the presiding magistrate at times knows as little about milk as a new-born babe, and that the greater the ignorance of the analyst the more positive he is generally in making wanton statements. No wonder, then, that the honest dealer is alarmed by the reckless operations of medical inspectors and the reports of food analysts, in consequence of which occasionally the innocent has to share the fate of the guilty. To my mind it is somewhat surprising that nothing has been done as yet either by the dairy farmers in the country or by the proprietors of town dairies, or by the milk trade generally, to expose the arbitrary decisions which have been given in milk prosecutions during the last twelve months on the strength of analytical reports, which bear internal evidence of gross ignorance of a practical acquaintance with milk and its chemical constitution. I can only explain this in a measure by assuming that the milk dealers

who have been unjustly mulcted into penalties or sent to gaol probably are painfully conscious of their malpractices in former years, and that they now look upon the unjust punishment as a righteous retribution for past sins. In the course of the evening I shall have to enter more fully upon the subject of milk adulteration, and find opportunity to show that several of the assertions which have been made by milk analysts are based on gross ignorance, and that in the interest of the fair and upright dealers, no less than in the interest of the consumer, it is desirable at once to relieve analysts who display such a degree of practical unacquaintance from their functions of food analysts. Before entering upon this part of my subject, allow me to direct your attention to the supply of milk; for the subject on the card is not merely the adulteration of milk, but also the supply of milk. With regard to the supply of milk, we have to consider—1, the country supply; 2, the town produce; 3, the supply of preserved or condensed milk. The question frequently asked is, Should milk be supplied exclusively from the country, or may it not be supplied equally well from town-fed cows? Another question is, Is country milk better than town produce, or *vice versâ?* And a third question frequently addressed to me is, What is the best food for milk cows? Let us examine briefly these questions.

1.—COUNTRY MILK.

Cows kept on nutritious grass and hay, and abundantly and exclusively supplied therewith, as a rule, produce richer milk and of a finer flavour than town-fed cows. An example of such extremely rich country milk was brought under my notice a good many years ago by Mr. Harrison, of Frocester Court, Gloucestershire. This milk, produced from cows kept on very good pasture land, contained in 100 parts:—

Water	83·90
Fatty matters (pure butter) . . .	7·62
Caseine (curd)	3·31
Milk sugar	4·46
Mineral matter (ash)	·71
	100·00
Per centage of solid matters	16·10

Such rich country milk, however, seldom finds its way into the hands of milk dealers, nor does milk from cows fed exclusively upon grass often contain as much as $7\frac{1}{2}$ per cent. of pure butter. On the contrary, if pastures are overstocked, and the herbage is naturally poor, and the food supply in consequence is insufficient to keep cows in a thriving condition, the deficiency of food tells immediately both upon the quantity and the quality of the milk. A striking instance in point came under my notice when I resided

at the Royal Agricultural College, Cirencester. The cows (16 or 18) were out in September on grass, but the pasture was poor and overstocked, and hardly enough grass was grown to meet the demand for restoring the daily waste to which the animal body is subject, and the supply of food consequently was ill adapted to meet an extra demand of materials for the formation of milk. Under these circumstances I found both the morning and evening's milk very poor, as the following analysis made with average samples from the milk of all the cows will show :—

	Morning.	Evening.
Water	89·95	90·70
Fat (pure butter)	1·99	1·79
Caseine (curd)	2·94	2·81
Milk-sugar	4·48	4·04
Mineral matter (ash)	·64	·66
	100·00	100·00
Solid constituents	10·05	0·30

Here we have two practical illustrations showing how largely the quality of the milk is affected by the amount and richness of the natural pasture upon which the cows are kept. In the case of the cows kept in the rich pastures of Frocester Court the milk contained, in round numbers, 7½ per cent. of butter; whilst the badly-fed cows, also out on grass, gave milk so poor as to yield in one instance barely 2 per cent., and in others about 1¾ per cent., of butter. For reasons which will appear in the sequel, I mention specially that my analyses were not made with the milk produced from a single cow, but with a fair average sample of the whole produce from some 16 or 18 cows which were milked in my presence. It thus appears that country milk may be either very rich or be very poor. All depends upon the number of grazing cows which are kept on a given space and the nature of the herbage. Speaking generally, country milk from cows out on rather poor and overstocked pastures, I believe, is poor, and compares very unfavourably with the milk from town-fed cows. Mr. J. C. Morton informs us, according to Mr. Harrison's careful records, 245,458 gallons of milk were produced in seven years by a herd, averaging 65 cows (Shorthorns), or 535 gallons were produced by each cow per annum, the food being grass and hay, with roots and straw in winter. Taking the Gloucestershire experience as our guide, for every 100 acres (22 being arable as ascertained by Mr. Harrison, in the cases of 23 farms) in a district where the average crop of meadow hay is probably 28 cwt. per acre, the stock kept is about 20 cows, 4 two-year-olds, 4 yearlings, 4 calves, 20 sheep, and 3 horses, equal in consuming power to about 32 cows. The hay crop represents rather less than 7 tons of grass, and the aftermath (at ¾ the first cut) is probably less than 3 tons per acre. The

whole cattle-food of the 100 acres, half the arable land being taken as in turnips and clover, may thus be put at 900 tons of grass, or 28 tons of green food per cow per annum, equal to 170 lbs. of grass a day to each. This, however, is where the grass is depastured—that is, fed in the most wasteful way; and it is probable that if the calculation had had to deal with the case of house-fed cows, it would appear that 150 lbs of green food daily, of the quality of ordinary meadow grass, or its equivalent, would suffice for ordinary Gloucestershire dairy cows. Putting, however, 250 gallons of milk against 28 tons of this green food we have 1 lb. of milk to every 11 or 12 lbs. of grass, or as nearly as possible 100 gallons of milk to every ton of hay.

(To be continued.)

REGENERATION OF NERVES.

Few histological subjects have received so much attention of late years as the changes which nerve-fibres undergo after division, and the mode in which reparation takes place in them. In the bibliography of an article by Dr. Herrmann Eichorst which has just appeared in Virchow's *Archiv* on "Nerve Degeneration and Nerve Regeneration," we count nearly seventy essays and papers as having been contributed to the more important periodicals since the publication of Sir James Paget's lectures on "Repair" and "Reproduction" in 1849, and several might be added to this long list. Yet after all this labour it would appear that our information is still imperfect and uncertain. Fontana first observed that nerves when divided healed by a material not very dissimilar to nerve-tissue itself. Michaelis believed that this took place even when half an inch or more of the nerve was removed; and though his statements were called in question by Arnemann and Müller, they were corroborated by Prévost, Schön, and several others. To this important point in pathological histology a physiological question soon became connected—namely, whether after the division and reunion of a nerve it recovered its functions. The progress of inquiry soon showed that it was necessary to distinguish two sets of phenomena that occur after section—one set indicating degeneration, and the other showing regeneration. So early as 1839 Nasse demonstrated that the phenomena of degeneration were essentially those of fatty metamorphosis; and all subsequent observers have been in accord with him, except in so far as Schiff, Landois,

and some others have maintained that healing by first intention may occasioually be seen, the nerve preserving then all its characters and attributes. Admitting that, as a rule, fatty degeneration takes place in the peripheric stump of a nerve after section, considerable discussion arose as to what parts of the nerve underwent the degeneration, the conclusion arrived at by most observers being that both the cylinder axis and medullary sheath were implicated. In regard to the mode of regeneration, two accounts have been given. Some have held that the nerve-fibres proceed from fusiform cells, developed either from the nuclei of the nerve sheath or from those of the medullary sheath, which arrange themselves in rows and then communicate by means of their processes; whilst others regard the new fibres as proceeding from the contents of the primitive nerve fasciculus enclosed within the sheath of Schwann—in other words, from the old axis-cylinders. Waller and Brücke held that the proximal end of the stump alone budded, so to speak; but almost all other observers believe that the new growth takes place from both extremities of the divided nerve.

Dr. Eichorst has undertaken a series of experiments on rabbits and dogs with a view of testing and corroborating or refuting these various opinions. He found the sural branch of the posterior tibial nerve in the rabbit a very convenient one to divide, and in almost all his specimens the nerves were stained with perosmic acid, whilst some were further tinted with carmine or aniline. The chief results of his experiments are that, even within twenty-four hours after section, the nerve near the cut surface presents certain characteristic appearances: it is swollen; the fibres are finely granular, their double outline is lost, and they end in sharp points, owing apparently to their contents being expressed and the nerve-sheath collapsing. The finely granular aspect, which is indicative of commencing fatty degeneration, rapidly extends from the cut surfaces in both directions, peripherally in the distal end and centrically in the proximal stump. If we follow the changes in the centric or proximal stump, we find, according to Dr. Eichorst, that after forty-eight hours the medullary sheath becomes broken up into long cylindrical segments, which soon nndergo further division into spheroidal masses, and finally into a finely granular material. The axis-cylinders appear to be much more resistent, and no change can be observed in them for a considerable period. The sheath of Schwann becomes thickened at the end of the second day, but again attenuates, so that at about the tenth day it appears to be striated. The perineurine is swollen

with serous transudate; and its nuclei, from being scattered and fusiform, become numerous and spheroidal. The process of regeneration begins at the end of the second week, when delicate, slender, homogenous, band-like structures can be observed running into and from the degenerate and swollen nerve-tissue near the point of section; these are young nerve-fibres, and are, he believes, the result of the breaking up of the undamaged portion of the nerve-fibres into fibrillæ, the fibrils developing from the centre towards the periphery. The development of the medullary sheath takes place in the same direction. In the course of the next few weeks the new fibres become more numerous, broader, and more closely similar to the original fibres. At the end of the second and beginning of the third month they acquire the outer sheath, which, moreover, is at first so loose that a space exists between the nerve-fibre and the membrane, which is finally abolished a few weeks later by the growth of the fibre. The changes in the peripheric portion of the divided nerve are in all respects similar to those of the central stump. The nerves, when they traverse the cicatricial tissue between the cut ends, long remain more slender, paler, and more thickly beset with nuclei, than the rest of the nerve. Dr. Eichorst does not appear to have paid any attention to the time and mode of recovery by the nerve of its functional activity—a subject that well deserves careful working out to settle the various results that have been obtained by different experimenters.

DR. SHORTT'S EXPERIMENTS WITH VIPER-POISON: UNCERTAINTY OF ITS EFFECTS—THE KING OF SNAKES—PROPOSED OPHIOLOGICAL CONGRESS.

ALL over the civilised world people seem to be ready greedily to read anything that is to be said about those ancient enemies of our race—the snakes: so I make no apology for giving you some details of a most instructive morning that I spent at Dr. Shortt's.

Having a great interest in the question of the destruction of the blood-globules in disease, and having read in Fayrer, and myself witnessed in former experiments of Dr. Shortt's, the effect of the viper-poison in disintegrating the blood-corpuscles (whilst the more fatal cobra-poison has no such effect), I eagerly availed myself of Dr. Shortt's invitation to

pass a quiet morning with him, and see some experiments with various kinds of viperine snakes.

Four snakes were selected for the experiments—a *Trimerisurus viridis*, which was made to bite a brown chicken; a *Trimerisurus anamallensis*, which bit a black chicken; another specimen of the same species, which bit a dog; and an *Echis carinata*, which bit a third chicken. The echis was a very tiny snake, with a body not larger than a goosequill; but the history of its achievements may be very brief; the chicken toppled over and fell off the table in two minutes, and was dead in two more.

The effects of the poison on the black and brown chickens were very speedily shown, and were watched by me with great interest for more than three hours, as I sat with notebook and pencil recording the symptoms. These were perfectly alike in each fowl. They began by a look of lumpiness and ruffled feathers, and a halting upon the side whose thigh had been bitten. Then they became stupid, so that they were easily caught and placed on a table, where they remained without moving. Their entire condition was one of narcotism, *pure and simple*. There they stood, usually on one leg, sometimes on both; shutting sometimes one eye, sometimes both; nodding their heads, and putting their heads under the wing, as in natural sleep; then waking with a start, looking stupid, as if trying too keep awake,—in fact, they resembled nothing so much as people in church on a hot summer's evening during the sermon. When roused they greedily pecked up some rice, but fell asleep over the dish, with some of the rice in their beaks. The pupils were unmistakably dilated. Thus these creatures continued till I was tired of watching them; but my interest in the matter was so great that I called each day for the next two or three days to see them, when I found them in perfectly good health, and yet with the bitten thigh unmistakably swollen and blue from subcutaneous ecchymosis.

The dog suffered most severely from the bite, and yelled fearfully. He limped away with the bitten leg useless, and soon lay down in a state of torpor, breathing very heavily; apparently quite insensible to touch or wound, for he did not winch in the least when I punctured the bitten thigh with a lancet. He was so scabby and mangy that I did not care to examine him too closely. The main fact is, that after lying all day twitching and torpid and apparently dying, he revived in the evening, and took rice. Next day he was still very torpid and languid, with the bitten thigh very swollen and œdematous. The day after, he seemed, as I was informed, in

very good health, and showed his dislike of ophiology by running away to quarters where he would be safer from experiment.

Whilst watching the dog and chickens that survived I examined the blood of the chicken killed by the echis. The bitten thigh was black from ecchymosis under the skin. The effused blood was glairy, and under the microscope all its globules were seen to be shrivelled and empty; whilst those taken from any other part of the body, or from the large veins, were quite natural. I could detect nothing amiss in blood which issued from a puncture close to the bitten part of the dog's thigh.

The snake which bit the dog died next day; he evidently was languid and sick. I give the narrative as illustrating the difference between a strong and weak dose of poison, and some of the sources of error which may beset the trial of antidotes.

Besides the vipers whose feats I have recorded Dr. Shortt's snakery contains a cage of remarkably fine cobras; but the pride of it is a couple of specimens of the king of snakes, the *Ophiophagus elaps*, the largest and savagest of poisonous serpents. One of these is twelve feet long, and very fierce. It is instructive to watch the difference between him and the cobras. The latter are mild-tempered, raise themselves in a threatening attitude by way of precaution, but are quite ready to glide away if let; the ophiophagus, on the contrary, will fly at and attack man, beast, and fish, and his fangs are larger, while his venom is equally virulent with that of the cobra.

It is said that Dr. Shortt meditates a voyage to Australia, taking with him a stock of live cobras, to give Professor Halford an opportunity of testing the value of ammonia as an antidote. I would propose au Ophiological Congress, consisting of Fayrer, Shortt, Nicholson, Weir Mitchell, and Fayrer's Calcutta assistants, with a select body of experimental physiologists, for the authoritative settlement of various questions. Its sittings would be very attractive.

R. D.

NOTES ON THE ARECA PALM.

Areca Catechu, L.

By John R. Jackson, A.L.S., Curator of the Museums, Kew.

Some interest having lately arisen among pharmacists with regard to the Areca palm (*Areca Catechu*, L.) owing to

its proposed introduction into the British Pharmacopœia as an officinal plant, a few notes on the tree itself and its uses may not be out of place.

The Areca palm is a handsome tree, growing to a height of from 40 to 60 feet, with a slender, erect trunk, averaging from one to two feet in circumference. It has regular, pinnate leaves, and long, linear leaflets, of a rich, dark-green colour. The circumference of the trunk is annulated or distinctly marked with the scars of the clasping petioles of former leaves. The fruits are each about the size of a hen's egg, consisting of a fleshy-looking drupe, which, however, on cutting is found to be very fibrous, containing a seed about the size of a nutmeg, and, like that well-known spice, ruminated or marked with thick, reddish-brown irregular lines throughout its entire substance. These fruits are borne in large bunches, springing from the crown of leaves. The spathe itself is used in some parts for making drinking vessels, for nailing over the bottoms of boats, and various other purposes.

The tree is known best as the betel-nut palm, and is cultivated in nearly all the warmer parts of Asia for the sake of the seeds, which are not only chewed in large quantities by the natives in countries where they grow, but are shipped to countries where the palm is not cultivated. The average annual produce of one tree is said to be about three hundred nuts. The tree is largely cultivated all over India, as well as in China, but is more abundant, perhaps, in Malabar, North Bengal, the lower slopes of the mountains of Nepaul, and the south-west coast of Ceylon. In Travancore alone there are nearly ten millions of these trees, the annual value of the produce of which is estimated at £50,000 sterling. It is said that about 80,000 piculs of the nuts are annually produced on the coast of Sumatra. Many varieties of the betel-nut palm are known to the natives under different local names; the nuts also vary much in size, but their quality depends upon their appearance when cut through, "intimating the quantity of astringent matter contained in them. If the white or medullary portion which intersects the red or astringent part be small, and has assumed a bluish tinge, and the astringent part is very red, the nut is considered of good quality; but when the medullary portion is in large quantity the nut is considered more mature, and, not possessing as much astringency, is not esteemed so valuable."

The nuts are usually gathered between the months of August and November. The seeds are removed from the husk and boiled in water. In the first boiling the water

becomes red and thick, and this is afterwards evaporated into catechu, but whether it is imported into this country as a commercial article is uncertain. The mode of collecting the catechu in Mysore is thus described:—"The nuts are taken as they come from the tree, and boiled for some hours in an iron vessel. They are then taken out, and the remaining water is inspissated by continual boiling. This process furnishes *kossa*, or most astringent *Terra japonica*, which is black, and mixed with paddy husks and other impurities. After the nuts are dried they are put into a fresh quantity of water and boiled again; and this water being inspissated, like the former, yields the best or cleanest kind of catechu, called *coony*. It is yellowish-brown, has an earthy fracture, and is free from the admixture of foreign bodies."

For the purpose of chewing, the nut is cut into narrow strips and rolled up with lime in the leaves of the betel pepper. The mixture has a hot, acrid taste, and aromatic and astringent properties. The habitual use of the betel-nut is considered by the natives to be very wholesome, but the effects are said by some to be due as much to the ingredients used with it as to the areca nut itself. Its constant use causes the teeth to become black and the mouth and lips of a brick-red colour. In soms parts of China the nuts, bruised and powdered, are mixed with the green food given to horses, and they are thus considered a preventive against diarrhœa. In the north of China small pieces of the nut are boiled and the decoction is taken as a domestic remedy in various visceral affections.

Though the use of the betel as a masticatory turns the teeth black, it is said to preserve them from decay in a remarkable manner, and this may be the reason why some English chemists have introduced the pulverized charcoal into this country as a tooth powder.

In Borneo the flowers, which are fragrant, are mixed with medicines and used as charms for the cure of many diseases. In some parts of India the juice of the young tender leaves mixed with oil is applied as an embrocation in cases of lumbago, and a decoction of the root is a reputed cure for sore lips, so that whatever may prove to be the value of the areca nut as an anthelmintic in this country, it is certain that the tree is much esteemed for its numerous uses in the East.—*Pharmaceutical Journal.*

LEGISLATION IN HUNGARY FOR THE SUPPRESSION OF THE CATTLE PLAGUE.

We extract from the *Times* of March 10th the following important communication from its *Hungarian Correspondent* on the subject of the suppression of the cattle plague and the adoption of legislative measures against its reintroduction into Hungary.

"It is not every day that a legislature is in the pleasant position of having to pass a Bill the beneficial effects of which are, so to say, guaranteed in advance. Such a Bill is that now before the Hungarian Diet, containing exhaustive provisions against the eastern cattle disease. The Bill does little more than reduce to a system and sanction the administrative regulations which have been gradually introduced since 1867, and to the marvellous success of which statistical returns testify plainly enough. They give comparative tables of the last six and the preceding six years—from the 1st of July, 1861, to the end of June, 1867, and from the 1st of July, 1867, to the end of December, 1873. The first thing, and an important matter too, which you learn from the tables is that the cattle disease has never been bred in Hungary, but has always been imported. Thus, in the period of twelve years over which the returns extend, it has made its appearance five times, leaving the remaining seven years quite free; and as far back as its course can be traced with anything like certainty it has been so. Thus you find that it broke out in Hungary, as all over Western Europe, in the wake of the allied armies marching into France. Then there is a respite till 1828, the time of the Russo-Turkish war, when it broke out among the large droves of cattle which were brought for the provisioning of the army from the interior of Russia to Bessarabia, thence spreading into Moldavia and Wallachia, and on to Transylvania, Galicia, and Hungary, whence it could not be extirpated till 1842. Then comes again a respite of six years, after which it again appears in Hungary in the wake of the Russian army in 1849, and maintains itself till 1856. Its next appearance is in 1861, and this, as well as its appearance in 1866, 1867, 1872, and 1873, can be directly traced to importation from Moldavia and Bosnia. The outbreak of last year is, above all, decisive in this respect. A herd of cattle is sent through Hungary to Vienna by rail. A stoppage occurs on the way at Oldenburg; the cattle are turned out, and a few days after the telegraph brings the news of the disease being in the neighbourhood; prompt

measures are taken, and, at the cost of 88 head, the disease is stamped out in a fortnight.

"All this leaves not the least doubt about the fact that the cattle disease in Hungary can be grappled with by proper regulations, and statistical returns equally prove that the regulations now in force and about to be sanctioned by the Legislature answer their purpose. In the six years from 1861 to 1867 the disease broke out in 680 communities, having an aggregate of 908,209 head of cattle. Of these 25 per cent. were attacked by the disease, and of those attacked 145,474 or 63·9 per cent. died or were killed. From the middle of 1867 till the end of 1873 the disease broke out in 430 communities, having 425,992 head of cattle, of which 7·8 per cent. were attacked, and of those attacked 20,258 or 60 per cent. died or were killed,—that is, calculatiug the head of cattle at only £5 in the first six years, Hungary lost through the cattle disease £727,370, while in the last it only lost £101,285. The supposition that the disease within the last six years had shown itself in a milder form than in the six years before is altogether excluded, as the rate of mortality is only a trifle smaller—60 instead of 63 per cent. And this favorable result within the last six years has been obtained at a cost of about £3000 more than was yearly spent before.

"The regulations themselves are entirely based on the principles laid down by the International Congress, which met on this subject in March, 1872, in Vienna, and at which England, Austria, Belgium, France, Hungary, Germany, Italy, Russia, Roumania, Switzerland, Servia, and Turkey were represented.

"As regards the first of the principles then laid down, the greatest possible publicity and a regular apparatus for gaining immediate information have been secured. The Minister of Commerce and Agriculture, to whose sphere the subject belongs, has made arrangements for daily telegraphic reports from all parts of the country on the sanitary state of the cattle, of which a summary is published every week in the official paper.

"Permanent regulations are made regarding the transport and sale of cattle under all circumstances. They are very stringent. In ordinary times the local authorities may give a bill of health, but when the disease is prevalent the signature of the veterinary surgeon is necessary. It is only valid for a week, and must be renewed in case the cattle are not sold, and it is only valid for the place for which it has been asked. Cattle not provided with a bill of health are not admitted to the markets. In every cattle market there must be a veterinary surgeon. Regulations are also embodied in

the Bill concerning butchers, slaughter-houses, pastures, inns where cattle are stabled, in all of which strange cattle are to be kept apart. Further enactments regulate the droves and transport by rail or water carriage. For the first certain lines are marked out; and as for the latter, they are under strict control as regards bills of health and disinfection of the trucks after every transport, and for carrying out these provisions the respective railways are held responsible.

"All owners of cattle, or those who have in any way to deal with them, are bound to give notice of any suspicious case which may come under their notice, and the local authorities have to take measures immediately to ascertain the facts of the case, and, even before the intervention of the county authorities, to draw a cordon round the suspicious place, to examine all the cattle, sheep, and goats in the village, to prevent any communication between them and prevent their leaving. The county and town authorities have at the first notice to send to the infected place and have the case examined by a veterinary surgeon, and see if all the precautions for isolating the place have been taken, and further to institute an inquiry how the disease was imported. If the case proves really the eastern cattle disease, a special commission is to be sent to the spot to superintend all the measures necessary for the prompt extinction of the disease. Should the disease spread in any county, one or more special commissions are to be appointed, each having its district according to the spread of the disease. They have very extended powers, and these may be strengthened by the despatch of a special government commissioner to the infected district, who may take all measures for isolating and stamping out the disease. The owner of the cattle destroyed is to be compensated by the State, provided he has given notice at once and has strictly conformed to the regulations. The expenses of the isolation, if they extend over a larger district, as well as the expenses of commissioners and veterinary surgeons, fall on the State. Those of isolating the single villages are borne in equal proportion by the villages and the State. For the cost of burying the carcasses, disinfection, &c., the villages and owners must provide.

"Severe punishments are decreed against offenders, especially those who buy or drive cattle without certificates, or on roads other than those fixed; and, above all, against those who break through a cordon, or try to smuggle in cattle, or hides, &c., through the quarantine localities.

"As regards intercourse with foreign countries, a distinc-

of regulations corresponding with the principles accepted by the International Congress in 1872 and those which have not. As regards the first, the principle of reciprocity is adhered to, and as long as there is no cattle disease there, cattle provided with certificates of health are admitted by rail, water carriage, and on roads specified. If there are only sporadic cases, and within twenty-five English miles of the frontier, a cordon is established; but cattle not coming from the infected districts and not having approached it on their way are admitted after examination. If the disease comes within twenty-five English miles, or is spread over a larger locality, importation can only be allowed as an exception by the permission of the ministry in each case, and under stringent regulations.

"Against the countries which have not yet introduced the regulations agreed upon by the International Congress a permanent cordon and quarantine has been established along the frontier. Even if they are quite free from the disease, they can only import cattle, &c., on certain lines of communication and have to submit to a quarantine of ten days. Should the disease break out among the droves, the animals are killed without the owner having a right to compensation. After the quarantine the droves are escorted at least twenty-five miles from the frontier, or to the nearest railway station, where they are once more to be examined. If the disease takes greater proportions, all importation ceases. In order to take precautions against smuggling cattle in within twenty-five English miles of the frontier, cattle registers are to be introduced, and all cattle marked according to their number, so as to afford control over the cattle in that part of the country.

"Stringent as many of these regulations are, above all those relating to the transport and sale of cattle in ordinary times when there is no disease, the necessity of them is so much felt that every one is ready enough to submit to them. Municipal corporations with us are not very pliant bodies as a rule, but in this instance it has been found that they readily co-operate. Only on one side has there been a difficulty—namely, in the direction of Croatia, which, although connected with Hungary, is, as regards its internal administration, quite independent. The same regulations are, indeed, more or less introduced there, but their execution leaves much to be desired, so that it becomes necessary to apply special measures in that direction.

"According to the last census, taken in the beginning of 1870, there were 5,118,088 head of cattle in Hungarian

tion is made between those which have established a system territory. This number is in itself sufficient to show how great an interest this question of the cattle disease involves. Apart from the actual losses which the cattle disease entails, its existence and the bad name which Hungary has got for it notably react in another way on the growth and development of this branch of rural industry. Many parts of Northern Hungary and all Transylvania have great facilities for rearing cattle, and might without difficulty produce in a short time twice the number they do now. However, this would be remunerative only if the Western markets were of easy access, which they are not. Above all, towards Germany, which would be the natural direction for exporting further west, owing to the fear of the cattle disease, the restrictions are such as to amount almost to prohibition. It cannot, of course, be expected that an idea so deeply rooted as that of chronic cattle disease in Hungary should yield at once; but the fact that Hungary has introduced all the measures which were agreed upon by the International Congress in 1872, and clear proof supplied by the statistical returns of what has already been done, may gradually lead to a removal of the restrictions now existing, and thus open the western markets to Hungarian meat, which might be supplied in large quantities and at remunerative prices."

GENEALOGY OF THE HORSE.

In his anniversary address to the Geological Society in February, 1870, and in a previous lecture delivered at the Royal Institution, Professor Huxley sketched the genealogy of the existing equine animals through the tertiary genera *Anchitherium* and *Hipparion*.

Professor Marsh's researches upon the tertiary mammalia of North America have revealed a most interesting series of horse-ancestors in that region, more complete even than that shown by European forms. In America, where the living horses are all descended from individuals imported from this side of the Atlantic, equine quadrupeds of several distinct species abounded in early post-tertiary times, and their descent with modification from forms more in accordance with the typical structure of the mammalia is peculiarly clear.

In early Eocene times there was a form, called *Orohippus* by Professor Marsh, which had in each fore-foot four toes. The representative of the thumb, or first digit, was deficient,

and the third or middle digit was larger than the rest. In Miocene times we have the *Miohippus*, in which the fifth digit had disappeared, so that each fore-foot consisted of three toes, the middle one being the largest. In the Pliocene genus *Hipparion* we still find three digits, but the two lateral ones are greatly reduced in size, and no longer take part in supporting the animal. Lastly, in the post-tertiary *Equi*, we have the third, or middle, digit of the largest size, and the lateral digits reduced to the slender metacarpals known to veterinarians as "splint bones." Similar changes took place in the hinder limb, except that this in the earliest genus *Orohippus* had only three toes. Professor Marsh justly infers that at some earlier period, probably in cretaceous times, *Orohippus* had an ancestor with four toes on the hind feet and five in front. He suggests that the reduction in the number of toes may have been due to the elevation of the region inhabited gradually leading the animals to live on higher ground, instead of the soft lowlands where a polydactyle foot would be an advantage. The gradual increase of size in the progressive forms is very interesting.

The *Eocene Orohippus* was about the size of a fox, the Miocene representatives of *Miohippus* and *Anchitherium* were as large as a sheep; the *Hipparion* and the associated *Pliohippus* of the Pliocene or latest tertiary epoch attained the size of an ass; and the true horses of post-tertiary times were as large as those of the present day. The demonstration of this direct and complete series of forms is particularly interesting in connection with the modern doctrine of the origin of species by descent with modification.—*The Globe*, March 19th, 1874.

CENTRAL VETERINARY MEDICAL SOCIETY.

The Ordinary Meeting of the above Society was held at the Royal College of Veterinary Surgeons, Red Lion Square, on Thursday, March 5th. The President, F. J. Mavor, Esq., in the chair.

Mr. Hunting suggested a modification of Mr. Moore's plan of treating sand-crack, and exhibited a hoof on one side of which a crack had been made artificially. This had been cut across by means of a hot iron, and gutta-percha cement had been used to fill up both fissures. The composition had been

rasped to the level of the hoof, and the defects were hardly to be discerned. The opposite side of the hoof had been grooved in a similar matter and left, to indicate the extent of the fissures.

The *President* stated that he had adopted Mr. Moore's method in two cases with success.

Mr. Batt described his plan of treatment, which consisted in cutting a V-shaped groove deeply into the horn in such a manner that the two lines commencing from the coronet united in the crack. Occasionally poultices are necessary after the operation, but more commonly the horse is capable of going to work at once.

The *Secretary* then read a paper by Mr. Hartley Batt on rheumatism. Mr. Batt treated the subject in a very able manner, referring in the course of his remarks to the results of his own experience, and the investigations of distinguished pathologists.

On the subject of causation he attached little importance to the influence of cold and wet, on the ground that the horses which are most exposed to the vicissitudes of the weather are least of all subject to the disease. He considered that the affection was due to the presenee of an excess of lactic acid in the blood arising from mal-assimilation. Local swellings and derangement of the secretive functions he described as the natural consequences of the constitutional disturbance. In favour of the hereditary transmission of rheumatism the essay expressed a decided opinion.

The treatment recommended by Mr. Batt included the administration of alkalies and purgatives, and the local application of blisters when necessary.

The *President* indicated certain points of the essay which he deemed to be worthy of discussion, and accordingly, as the evening was far advanced, the further consideration of the subject was postponed until the next meeting, on Thursday, April 9th.

Present, 14 fellows and one visitor.

JAMES ROWE, Jun., *Hon. Sec.*

YORKSHIRE VETERINARY MEDICAL SOCIETY.

THE annual meeting of this Society was held at the Queen's Hotel, Leeds, on Friday, the 20th February, the President, Mr. Broughton, in the chair.

The following members were also present, viz. Messrs. Cuthbert, Greaves, Nicholson, Secker, James Freeman, Joseph Freeman, Patterson, Day, Naylor, Anderton, Peter Walker, Parlan M. Walker, Carter, and the Secretary.

Messrs. C. Steele (12th Lancers), J. E. Scriven, and William Donaldson were present as visitors. Apologies for non-attendance were received from Messrs. Dray, W. A. Taylor, Fryer, Bale, Murdoch, J. Schofield, W. C. Schofield, Professor Fearnley, and John Freeman.

The minutes of the last meeting were read and confirmed.

Mr. Parlan Walker, M.R.C.V.S., Halifax, was unanimously elected a member, proposed by Mr. Cuthbert, seconded by Mr. Broughton.

Mr. J. E. Scriven, M.R.C.V.S., Abberford, was nominated for election.

The President then proposed, and Mr. Secker seconded, the proposition, viz. "That the sum of fifty pounds from the funds of this society be granted in aid of the building fund of the R.C.V.S."

After some little discussion the proposition was carried.

The President read a communication from Professor Thomas Walley, complaining of the injustice done to the veterinary students who entered the schools prior to the passing of the new bye-laws, and who, as a matter of right and equity, are entitled to be examined for their diplomas under the old system. After some discussion it was resolved, on the motion of Mr. Naylor, seconded by Mr. Day, "That it is not advisable to interfere with the council in the matter."

The President then read the inaugural address, wherein he reviewed the proceedings of the Society during the first decennial period of its existence, and then sketched out his ideas as to what should be done in the future, in order to render the meetings scientific as well as useful and profitable to the members.

Mr. Day, of York, promised to introduce a paper for discussion at the April meeting.

The President's Address.

The pleasing duty of presiding over you during the current year having devolved upon me, I avail myself of this opportunity of tendering you my thanks for the honorable position you have placed me in, and to assure you that I will use my best efforts to carry out the duties of President with the same zeal, assiduity, and urbanity of manner which my predecessors have exercised, not doubting but that I shall receive the support of the members

at each meeting. As our society has now completed a decennial period of existence, and as I have been for some years past its honorary secretary, I think the present time peculiarly adapted for my taking a retrospective as well as a prospective glance at our proceedings. In taking a retrospective view of our doings I shall deal with the statistical part of the subject as briefly as possible; still, I think that a short account of the work done in each year will refresh the minds of the senior members and furnish some necessary information to the junior ones.

After the preliminary stage in the formation of our society was completed the first annual meeting was held in this house on the 29th January, 1864, when our esteemed friend Mr. Dray, the President, gave us a very excellent inaugural address.

The second meeting was held at Bradford, when Mr. Charles Secker read a paper on *Laminitis,* which furnished an excellent subject for discussion. The third meeting was held at Harrogate, when Mr. Naylor gave us an interesting paper on the *Natural History of the Horse.* At this meeting Professor Williams related a case in which he had administered a five-drachm cathartic purging ball to a well-bred horse, and death ensued in consequence. It being supposed that the horse was in perfect health prior to the administration of the physic, the owner was very wroth and threatened legal proceedings against Professor Williams. However, upon a *post-mortem* examination being made, at which I was present, *ramollissement* of the liver and *fatty degeneration of the kidneys* were so apparent that the owner was satisfied that no blame attached to Professor Williams.

The fourth meeting of the year was held at Ripon, when Mr. Fryer, of Kirby Fleetham, read an excellent practical paper on *Hernia.*

At the second annual meeting in January, 1865, the first annual dinner was held, on which occasion we were honoured with the presence of the late Professor Spooner and a number of gentlemen well known in the veterinary profession. Mr. Dray was again the President, and I think I am not far from the truth in characterising this meeting as one of the most successful gatherings of veterinary surgeons ever held out of London.

At the second meeting, held at Wakefield, Professor Williams' most instructive paper on *Counter Irritation* was discussed with considerable profit to the members present. At this meeting Mr. Naylor proposed a resolution that the Royal College of Veterinary Surgeons be requested to extend the time of the students' attendance at the schools along with an improved education.

The next meeting was held at Harrogate, when Mr. Graves read a valuable paper upon *Influenza.* This was subsequently

published in the *Veterinarian*. It gave ample scope for differences of opinion to be expressed as to the treatment of the various phases of this affection.

At this meeting Mr. Friend, of Liverpool, invited the members to join their Lancashire friends in the formation of a "Veterinary Protection Society." A deputation from this society met other deputations at Manchester in September, the beneficial result of which you are all acquainted with.

A special meeting of the society was held on the 22nd of August to discuss, alter, and revise the rules. Another special meeting was also held on the 29th August to discuss the newly imported disease *Cattle Plague* or *Rinderpest*. This affection was discussed as far as practicable at this time, and some cases of the malady in its early stages were inspected by the members in the Leeds-slaughter house.

The last meeting for the year was held at Halifax, when there was an excellent attendance of the members. The revision of the rules was approved of, and the rules of the newly formed "Veterinary Defence Society" were also taken into consideration. At this meeting the President, Mr. Dray, gave an address on the cattle plague. This was published in the *Veterinarian*. Mr. McTaggart also read a paper on *The Comparative Merits of Allopathy and Homœopathy*, in which he advocated the homœopathic method of treatment. Mr. McTaggart's paper was also published in the *Veterinarian*.

The annual meeting in 1866, under the presidency of our lamented friend Mr. McTaggart was well attended. After the President's inauguaral address his paper, read at the previous meeting, was fully discussed. At this meeting a handsome binocular microscope, subscribed for by the members of the society, was presented to Professor Williams as some acknowledgment of his labours in having placed the society upon a firm basis.

The second meeting was held at Pontefract, where Mr. Broughton read a paper on *The Anatomy and Physiology of the Stomachs of the Ox*. A letter of condolence to Miss Dick upon the death of her brother was also unanimously agreed to.

The third meeting took place at Harrogate, when Mr. Broughton read a paper on *The Diseases of the Stomachs of Cattle*, which was productive of much practical information being obtained from some of the senior members. A resolution was passed at this meeting to the effect "That the Society co-operates with the Liverpool, Lancashire, West of England, and Midland Societies, in forming and supporting the 'Mutual Defence Society.'"

The last meeting of the year was held at Bradford, where a

good attendance of the members took place and a long discussion ensued on the constitution of the "Veterinary Defence Society." Here also Mr. Carter read a paper on *Fistulous Abscesses*, the discussion of which was adjourned for want of time.

The annual meeting in 1867 was well attended, and the President, Mr. Greaves, delivered a most excellent inaugural address, which was published in the *Veterinarian*.

The second meeting was held at Huddersfield, when Mr. Carter again read a portion of his paper on *Fistulous Abscesses*, and a long and exceedingly practical discussion followed.

A complimentary dinner to Professor Williams took place at Bradford on the 19th of June, upon his leaving that town to become Principal of the Edinburgh school.

The third meeting was held at Hull, when our much lamented young friend Horne, of Barnsley, read an essay on *Parturient Apoplexy*, which was provocative of an excellent discussion.

The concluding meeting for the year took place at Wakefield, when Mr. Naylor delivered an able discourse on *Rabies in our Domesticated Animals*.

The annual meeting in 1868, under the presidency of Mr. Charles Secker, was well attended. At this meeting the President for the year of the Royal College of Veterinary Surgeons, Mr. W. Field, was present, and Professor Williams was elected as honorary member of the society. The annual subscription was reduced to 10s. 6d. at this meeting, but I regret to state it had no effect in causing an increase of the members of the society.

At the second meeting, held at Leeds, Mr. P. Walker read an able and exceedingly practical paper on the *Diseases of the Sinuses of the Head in the Horse*, which led to a profitable discussion.

The third meeting in the year was held at Harrogate, when Mr. Godfrey Smith read a paper on *Pneumonia in Cattle*, which also induced a good practical discussion.

The last meeting was held at Leeds, the annual meeting of the "National Veterinary Benevolent and Mutual Defence Society" taking place the same day. Mr. Fearnley read a paper on *The Examination of Horses as to Soundness*. An excellent and practicable discourse ensued.

The annual meeting in 1869 was under the presidency of Mr. Naylor. There was a good attendance of members. A resolution was passed that all the meetings of the society be held in Leeds. The discussion upon Mr. Fearnley's paper was resumed and completed, after which the President read the inaugural address, dwelling principally upon the education of the veterinary pupil. This paper was published in the *Veterinarian*.

The second meeting in this year was productive of Mr. Cuth-

bert's excellent paper upon the *Diseases of the Hock of the Horse*. A thoroughly practical and long discussion ensued, to the profit of all present. A grant of £30 to the Benevolent Fund was made at this meeting.

The President, Mr. Naylor, invited the members to a conversazione at the Bull Hotel, Wakefield, on the 10th of June, a re-union that was thoroughly enjoyed by all present.

At the summer meeting in this year we were favoured by Mr. James Freeman with a lecture upon *Protracted Parturition*. The lecturer explained his *modus operandi* by diagrams; and a collection of instruments well adapted for relief in these troublesome cases was exhibited.

At the concluding meeting of the year Mr. Fearnley gave us a very useful *Essay on Wounds*, which produced a good and useful discussion.

The annual meeting in 1870 was under the presidency of our esteemed friend Mr. James Freeman, and was well attended. A resolution was passed that the veterinary medical societies should be represented in council, but owing to a little mismanagement this good intention was defeated.

At the second meeting this year Mr. Anderton read an excellent practical paper on the *Diseases of the Stomachs of Cattle*.

At the third meeting the intending essayist was unfortunately prevented from fulfilling his engagement. An impromptu discussion upon several subjects took place, to the mutual advantage of the members.

At the last quarterly meeting our esteemed friend Mr. Dray announced his retirement from the active duties of the profession and his intention to reside in the south of England. Mr. Nicholson read a paper *On Castration*, which furnished ample food for practicable information.

The annual meeting in 1871 was held under the chairmanship of Mr. Nicholson and was well attended. After the President's inaugural address our lamented friend Mr. William Taylor read a paper on the *Diseases of the Intestines of Cattle*.

The annual dinner this year was a complimentary one to Mr. Dray, when the President presented to that gentleman a splendid illuminated address expressive of the good wishes of the members.

At the first quarterly meeting this year Mr. Bale read an essay on *Parturient Apoplexy*, which excited a practical discussion.

At the summer meeting the trial of Lord Churchill *v.* Day, V.S., was commented upon, and a vote of thanks was accorded Mr. Day for the spirited manner in which he had defended his professional reputation. At this meeting also Mr. Greaves read

a paper on *The Education of the Veterinary Student*, the subject being ably dwelt upon by that gentleman.

At the last meeting this year we were favoured by Mr. Greaves reading his essay on *Enzootic and Epizootic Diseases of the Horse*. The subject elicited much new matter both theoretical and practical from the pen of the essayist, and the highly instructive paper was thoroughly enjoyed by all present.

At the annual meeting for the year 1872, under the presidency of Mr. Cuthbert, a letter of condolence was sent to Mrs. Charles Spooner upon the death of her husband, Professor Spooner.

After the President had delivered the inaugural address a discussion took place as to whether infection be carried solely in the air, or by what other means is it transmitted.

At the spring meeting the subject of the transmission of infection was further discussed, and the consideration of four questions on veterinary politics occupied the allotted time of the meeting.

The summer meeting was pretty well attended. Mr. Fearnley read a paper *On the Use of Chloroform and Morphia in Intestinal Affections*. An excellent practical discourse followed.

The final meeting in 1872 was productive of Mr. Ferguson's paper *On Shoeing*, which called forth an able, spirited, and profitable discussion.

The annual meeting in 1873 was under the presidency of Mr. Carter, who, after delivering the inaugural address, gave the history of two unusual and interesting cases that had recently occurred in his practice, viz. one of fibrous tumour in the ileum and a second of diseased brain in the horse. After the dinner Mr. Graves submitted three questions on veterinary politics for the opinion of the members.

The presentation of a timepiece to myself as your Honorary Secretary also took place at this meeting.

The spring meeting was characterised by an inquiry into that formidable malady *Splenic Apoplexy*, the subject being introduced by the indefatigable Mr. Naylor. The discussion was interesting, although no new light was cast upon the causes of the disease.

The summer meeting was held in Hull, by special resolution, during the meeting of the Royal Agricultural Society. Our respected and much esteemed member and friend, Mr. Greaves, again favoured us with food for the mind by giving us papers upon three subjects, viz. *Abdominal Abscesses*, *Protrusion of the Penis*, and *Forcibly drawn-out Tongue*.

At the final meeting for this year Mr. Fallding read a paper on *Phrenitis*, which produced a good discussion.

I trust, gentlemen, that I have not wearied you by reading

this condensed statement of the work gone through by this society during the past ten years. We have had papers numbering nearly thirty, treating upon various pathological, physiological, and anatomical subjects, appertaining to horses and cattle. We have discussed numerous questions of veterinary policy and have passed resolutions thereon, and there is no doubt that our action regarding these questions has facilitated those educational and practical reforms which have recently taken place in the veterinary schools and in the council of the Royal College of Veterinary Surgeons. We have assisted personally and by a grant of money from the funds of this society have helped to place the Veterinary Mutual Defence and Benevolent Society upon a firm and solid basis. I look upon the establishment of this society as one of the brightest ornaments of the profession at the present day; and I would here take the opportunity of saying that if there are any gentlemen among us who have not yet contributed to its funds, I would earnestly counsel them to enrol themselves without delay as members of the society. The amount of subscription is only 10s. 6d. per annum, a mere trifle in comparison with the satisfaction of knowing that you are doing something to help the widow and fatherless in affliction, and assisting a brother practitioner when entangled in the meshes of the law through no neglect or carelessness on his part.

I find the greatest number of members upon the roll of our society to have been thirty-nine. At the present time we only number twenty-six, including two honorary members, viz. Mr. Dray and Professor Williams. We have lost by the grim tyrant death five members, viz. Messrs. McTaggart, Horne, Taylor, Bowman, and Smith. "Peace be to their *manes*."

Several members have resigned, some of them for really very trivial reasons, and others have been struck off the roll for inattention to the rules and non-payment of subscriptions.

Having now nearly exhausted the retrospective glance at the proceedings of our society, I shall proceed to consider the prospective view of our operations. I have first to express regret that our members have diminished during the last three years; but I am hopeful for the future, for I am firmly of opinion that as the veterinary surgeon becomes better educated, both scholastically and professionally, our numbers will be gradually increased. It is much to be lamented that so many of our brethren hold themselves aloof from us, for I find that in this large county of York there are from 140 to 150 veterinary surgeons, while our average number of members is about thirty —only one in five. It is perfectly astounding that such an amount of apathy should be found amongst us in these days, when societies and combinations exist in all trades and professions,

having for their objects the elevation of the status of their members and charitable purposes. I read in the newspapers only the other day that even barristers have a charitable organization to relieve their distressed brethren and families. Charity, the greatest of all virtues. How constantly are we reminded in Holy Scripture to be charitable:—"Whoso hath this world's goods and seeth his brother have need, how dwelleth the love of God in him?" "Blessed is the man that provideth for the sick and needy; the Lord shall deliver him in the time of trouble."

I find, gentlemen, that although the society has discussed a great number of subjects, there is a vast field of inquiry still untrodden; for instance, the anatomy and pathology of the larynx and its appendages; the diseases of the chest in both horses and cattle; the anatomy, physiology, and pathology of the liver and urinary organs; the diseases of muscular and tendinous structures; and those of the bony fabric of the horse and cattle, have received very little attention; while that beautiful piece of mechanism, the eye, has scarcely been noticed at all by any one of the essayists. There are a great many more subjects which I could mention as available for discussion. I hope, therefore, that those gentlemen who have not yet brought in papers will not now hesitate to do so, but use their pens for the general good. It is only by every member putting his shoulder to the wheel and contributing his quota of professional lore that we can render our meetings either practical, instructive, or interesting. I think that if one could induce any member who is pretty well up in Anatomy to give us an anatomical demonstration occasionally, it would be a very agreeable change; and I would here say that I am sorry we have lost Professor Fearnley's services, because I have no doubt he would have been delighted to have rendered us assistance in this department of science. Again, Chemistry and Materia Medica have not yet received the attention which they so justly merit: a paper upon either of these branches would be a most agreeable diversion. The diseases of sheep and dogs are also still untouched.

We have also up to the present time completely ignored the microscope. How could we better employ half an hour at every meeting than by studying the revelations of this wonderful instrument? I am of opinion that the investigation of structural and morbid anatomy by the microscope would have the effect of raising our scientific and general knowledge to a far higher standard than we can possiby attain by any other means. I think it is necessary that I should advocate this study more emphatically because our young veterinarians are now instructed in microscopic anatomy—healthy and diseased—and we older members of the profession must

make some attempt to keep pace with the rising generation. I therefore throw out the suggestion that we should expend a few pounds of the society's money in purchasing a good instrument for the use of the members. The instrument might be in charge either of the President for the time being or of the Secretary, as thought best. It would be ready for use at every meeting, or even otherwise made available for the use of the members as may be thought proper. I am sure that the study of the appearances of diseased meat under the microscope would be of immense advantage to us, as we are frequently called upon to give a professional opinion in these cases.

In conclusion, I venture to express the hope that each and every member will use his best endeavour to be present at our meetings as often as possible; and that all will come with their minds refreshed by reading the latest opinions, so as by reflection to be the better enabled to use their experience for the benefit of others. I also trust that each member will use his gentle persuasion to induce his neighbouring brother practitioner to come amongst us, for unless we keep up our numbers the cash in the bank will gradually diminish, and sufficient funds will not be at our disposal. It now only remains for me to thank you for your attention, and to trust that some practical good may arise from the remarks and suggestions I have made.

At the close of the meeting the annual dinner was held. After the usual loyal toasts, Mr. Carter, V.P., proposed the toast of the R.C.V.S., which was responded to by Messrs. Naylor and Greaves. The meeting was both pleasant and profitable and was thoroughly enjoyed by all present.

JOHN H. FERGUSON,
Hon. Sec.

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

A SPECIAL meeting of the above Association was held at the Blackfriars Hotel, Manchester, on Wednesday, the 14th January, the ex-President, Mr. W. Aug. Taylor, in the chair. The following gentlemen were present:—Messrs. Greaves, Hopkins (Manchester), W. Whittle (Worsley), Woods (Wigan), Woolner (Heywood), and the Seeretary.

The business of the evening was to elect a President for the current year. Mr. J. Challinor (Worsley) having declined the

office, the ex-President was ultimately prevailed upon to take the chair for another year. A vote of thanks to the President for the ready manner in which he had helped the Association out of a difficulty by again taking the chair brought the meeting to a close.

The ANNUAL GENERAL MEETING of the Association was held in the Blackfriars Hotel, Manchester, on Thursday, February 12th, at 5 o'clock p.m. There was a large attendance of members and visitors; W. Aug. Taylor, Esq., President, in the chair; the following members were also present:—Professor Williams, of the New Veterinary College, Edinburgh; Messrs. Greaves, J. Lawson, Hopkins, Locke, and Roberts (Manchester), Dacre, Cox, and Bostock (Altrincham), Whittle (Worsley), James Taylor (Oldham), Woods (Wigan), A. Prescott (Pendleton), Fergusson (Warrington) Lomas (Stockport), Woolner (Heywood), and Lowe (Bolton).

The following gentlemen attended as visitors:—Messrs. T. Taylor, P. Taylor, A. L. Gibson, A. Lawson, J. L. Taylor, Atkinson, Donaldson, G. Watson, Brown, and Graham (Manchester), Naylor (Wakefield), Freeman (Hull), Cartwright (Wolverhampton), Kenny, Reynolds, and Ham (Liverpool), Barnes (Malpas, Cheshire), Burmel (Oldham), and Stanley (Birmingham).

Letters of apology for non-attendance were read from Professors Simonds and Pritchard, Royal Veterinary College; Professor McCall, Veterinary College, Glasgow; Professor Fearnley, Veterinary College, Edinburgh, and other gentlemen.

The President, in his address to the members, contrasted the past with the present status of the profession, stating his belief that an advancement had been made, and that veterinary science was undoubtedly progressing; in fact, he anticipated a bright future for the veterinary profession. He also reviewed the causes of the present lassitude pervading the members of the veterinary medical societies, entreating them to cast off that lethargy and to support as they ought the officers elected to conduct the meetings, and to evince more interest in the affairs of Associations, which would obviously contribute largely to their welfare. The members and visitors afterwards sat down to an excellent dinner, W. Aug. Taylor, Esq., in the chair.

After the usual loyal and patriotic toasts had been drunk, the President closed the meeting with an earnest appeal to the members to give more support to the Association than heretofore; the evening was spent in a most pleasant and agreeable manner, good humour sitting on every lip.

J. ROBERTS, *Hon. Secretary.*

THE SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

The following report of the Annual General Meeting is extracted (with one or two trifling amendments) from the 'Scotsman' of 5th March:

The annual meeting of the Scottish Metropolitan Veterinary Association was held March 4th. Principal Williams, of the New Veterinary College, who occupied the chair, was re-elected President of the Association for the ensuing year.

Professor Walley brought under the notice of the meeting the decision recently arrived at by the Council of the Royal College of Veterinary Surgeons in London, by which examinations of students for their diplomas had been postponed for a year longer than under the old regulations. The students who had entered on a course of study while the old regulations were in force had, he said, petitioned the Council, praying that they should be examined under the old rules, but their request had not been acceded to.

On the motion of *Mr. A. Balfour, V.S.*, Kirkcaldy, seconded by *Mr. Borthwick, V.S.*, Kirkliston, it was agreed that a memorial should be sent from the Association to the Council of the Royal College of Veterinary Surgeons, praying them to grant the petition of the students as to examination in April instead of next year.

Mr. W. Cumming, M.R.C.V.S., treasurer, submitted his financial statement for the past year, which showed a balance at the credit of the Association of £17 18*s.* 6*d.*

Principal Williams then delivered his presidential address. In the outset he thanked the Association for electing him president for the second time. The aims of the Association were the elevation of their profession, and the discussion of subjects important to veterinary science and the general public. During the year they had had several interesting debates, and although the attendance of local veterinarians had been small, there had been always a large turn out from the country, and he was sure that from no meeting had the members gone away unedified. He thanked the members of the Society for the support they had given him under recent trying circumstances, and it was to the weight of that support that he ascribed in no small measure the rapidity with which his college had been recognised by the Government. Passing on to discuss matters connected with the profession, he said that latterly he had noticed that parasitic diseases were considerably on the increase among the lower animals. Many specimens had come before him from the lungs

of sheep and calves. These parts were studded with numerous little white vesicles which might be thought tubercular, but when examined under a microscope, each of the vessels was found to contain a worm in various stages of development, while others were quite dry and converted into a calcareous material. He had noticed that many sheep which had been slaughtered when suffering from these white vesicles were in a debilitated condition, but he had not had an opportunity of examining the mutton from these animals. The probability, however, was that the parasites would be found not only in the lungs, but in the various structures of their bodies, and it became a question of public health whether these animals were fit for food. He was strongly of opinion that measures should be taken to examine the mutton of such animals, and that if it contained parasites it should be condemned. He had a pony which died last year from intestinal parasites, and he fed some fowls on the flesh of the pony. The fowls died, and on examination they were found filled with the ova of parasites, and the parasites themselves in various stages of development. If such things happened to fowls they would happen to human beings, and the matter should be carefully studied. With reference to the question of examination of students by the Council of the Royal College of Veterinary Surgeons, a good deal of unpleasantness had arisen in the profession. He was sorry, indeed, that the Council had not granted the prayer of the students, as they had distinctly promised to him to do. The question had arisen in Scotland about a Scottish charter. He must confess that he could never be a party to anything that would call for the aid of any extraneous body. He would never consent himself to have a body to manage the affairs of their profession except that body was composed of veterinary surgeons; but whether the Council of the Royal Veterinary College as at present constituted was satisfactory was another matter altogether. If they were to have a charter for Scotland, he confessed he would rather see the body of curators consisting of veterinary surgeons only, not of the Highland Society, nor any other body outside the profession. Veterinary surgeons knew what was required by the profession, and they would be able to make rules to meet these requirements. All things considered, he would be sorry to see a charter granted for Scotland, although the Council of the Royal Veterinary College as at present constituted did not, in fact, meet with the approbation of the members of the profession at large. He thought it would be better if a new charter was procured for the body corporate of veterinary surgeons, and if the manner by which members of the Council were elected were altered. Instead of going to London annually, which was ridiculous (though if

other points were granted, he would not make any great objection to going to London); the elections might be made in districts throughout the country—each district sending a member to the Council. If this were done, the veterinary profession at large would be represented in the Council. While giving every credit to the members of the present Council, he contended that they were influenced by local feelings and prejudices, and passed resolutions favorable to one portion of the profession, perhaps at the expense of another portion. He also thought that out of twenty-five members for professors from one college was too large a representation. At the last annual meeting Professor M'Call, Glasgow, was proposed, but, unfortunately for the profession and Scotland, he was not elected a member of Council, the man selected over him being an assistant professor or demonstrator of anatomy in the London College. That was done for a purpose, and not for the benefit of the profession at large. There was another question which affected their profession in a large degree, namely, the appointment of inspectors under the Contagious Diseases Animals Act. Policemen who knew nothing whatever about cattle diseases were appointed inspectors, and this ought to be represented strongly to the Government. He thought that the appointment of policemen to such offices was an indignity and an insult to their profession. Again, he thought that the Contagious Diseases Acts as carried out at present would never extirpate pleuro-pneumonia. Before the law could be beneficial it should have the power to prevent farmers or dairymen from taking cattle into districts which were already infected. If they could declare, say, a byre infected, and prevent any fresh animal from being taken there until a fixed period after the last case of pleura had occurred there, the disease would then be thoroughly stamped out. This consideration ought, he insisted, to be brought under the notice of the Privy Council.

Professor Walley said he had noticed a considerable increase of parasites in the so-called vesicles in the lungs of sheep during last year and the year before, although not to the same extent during the present year. The question whether the flesh of the animal so affected should be allowed to be used as food was a very important one, not only to the veterinary surgeon, but to the public at large. They knew that many of the lower classes were in the habit of eating food which was very improperly cooked, and this was specially the case in regard to lungs, livers, and also the stomachs of animals. They could readily see, therefore, how parasitic diseases would be conveyed from animals to human beings—more especially as they were thoroughly acquainted with the fact that the parasites found in animals were identical with those discovered in men. They always found such parasites

undergoing one or other transformations in the bodies of men or of animals—from one stage in the body of a man to another in the body of an animal, or *vice versâ*. He thought the suggestion of Principal Williams in regard to the examination of meat ought to be carried out very strictly, as he was perfectly sure that thousands of people in our large towns were affected by the ova of worms which entered their bodies in the consumption of the food which he had referred to. It was also highly probable that many parasitic diseases in human beings were brought about in this manner. He acquiesced in Principal Williams' idea as to the representative character which the Council of the Royal College of Surgeons ought to take, maintaining the truth of the statement that the Council as at present constituted did not represent the veterinary profession at all. So long as the present law existed pleuro-pneumonia would not be stamped out. He was quite positive that it was not safe to put cattle into any byre within six months after a case of that disease had occurred there. The present system of inspection by policemen was a farce, as none of them knew anything about cattle or their diseases.

Mr. Baird, V.S., Edinburgh, said that, according to his experience, the power of contagion of pleura was very difficult to define. He had found it breaking out in new steadings, as also in one part of an old steading while the remainder was quite free.

Mr. Robertson, V.S., Kelso, thought that the danger from parasitic disease was not very great, as the worms could be killed at a very low temperature. Of course it was a different thing if the people consumed the meat raw.

The discussion then dropped, and the proceedings terminated with a vote of thanks to Principal Williams for presiding. The members of the Association afterwards dined together at the Ship Hotel, East Register Street, Principal Williams in the chair, and Professor Whalley, croupier.

The Secretary has only further to add that Mr. Robertson Kelso directed the attention of the meeting to a case of disputed, age in a prize bullock in which he had been engaged. The animal had been exhibited at one of the recent fat-stock shows as a two-year old, and gained the first premium in that class, but was afterward objected to on account of his age. The animal had been slaughtered and the head and everything else disposed of, but those objecting brought forward proof that he had four permanent incisors up and two others making their appearance. Taking breed and other circumstances into consideration, Mr. Robertson had given his opinion that the animal was nearer three than two years old, and asked the members for their opinion as to the *earliest* period of dentition in the ox. The members

coincided with the opinion given by Mr. Robertson, none of them having met with cases of earlier dentition than the recognised periods:—1 year and 9 months to 2 years, 2 years and 3 months to 2 years and 6 months, 2 years and 9 months to 3 years, and 3 years to 3 years and 3 months, or 3 years and 6 months.

Professor Walley exhibited a specimen of a very large calculus in the biliary duct, with the following details:—

"The subject of this case was an aged dun pony, thirteen hands high, which had been purchased for dissection. During an examination, for their own instruction, as to physical lung symptoms two of the students, Mr. Barker and Mr. Roshwell, detected tenderness on pressure over the region of the liver and a yellow condition of the mucous membranes. A few days subsequently Professor Walley, without knowing anything of this condition of the liver, detected the existence of leucocythæmia whilst examining the blood, and came to the conclusion that chronic disease of the liver or spleen was going on. On the two gentlemen above named mentioning what they had noticed, which led Professor Walley to consider the liver as the seat of disease, the dissection afterwards confirmed this view.

"When the duodenum and stomach were laid open a number of biliary calculi made their escape, varying in size from a pea to a small walnut. They were coated with thick, yellow, inspissated bile, which had a very soapy feel. Another calculus partially protruded from the valve of the biliary and pancreatic duct, which was unusually large; while the common biliary duct itself contained several small calculi and one large one, measuring three inches in circumference; the duct three inches and a half in its natural flaccid condition. The liver, on the whole, was enlarged, dark coloured, and scirrhous, a portion of the right lobe, however, was atrophied and extremely firm. A large quantity of fat was found in the abdomen; the urine gave biliary reaction; spleen, &c., healthy."

C. Cunningham,
Secretary.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

Monthly Council, Wednesday, March 4; Mr. Holland, President, in the chair.

Veterinary.—Colonel Kingscote, M.P., reported that the committee had elected Viscount Bridport chairman for the year 1874. He further reported that two letters had been addressed by Colonel Maitland, of Holywich, Eden Bridge, Kent, to the

Secretary, with respect to the mortality of cattle from the disease called "Quarter evil," or "Black-leg," and that the same had been laid before Professor Simonds. The committee recommended that his letter on the subject be published in the proceedings of the Council meeting.

A letter had also been addressed to the Secretary from Mr. J. G. Cooke, Caston Hall, Attleborough, stating that he had suffered very severely from abortion in his ewes, almost every ewe being affected. This letter had also been forwarded to Professor Simonds, who communicated with Mr. Cook, informing him that he considered that the result was due to too lavish a use of succulent food, especially turnips, which Mr. Cooke eventually acknowledged had been the case.

The committee recommended the payment of the grant of £200 to the Royal Veterinary College for the year 1873.

The committee desired to express their regret at finding from reports received that foot-and-mouth disease had again broken out in many parts of the country. The report was adopted.

The following is Professor Simonds' letter in reference to "Quarter-evil:"

"Royal Veterinary College, Camden Town, N.W.,
"Feb. 24, 1874.

"My dear Sir,—I return Colonel Maitland's letters on the subject of the disease known as 'Black-leg,' or 'Black-quarter,' &c. This affection, as you are doubtless aware, prevails more or less in every part of the country, and being a blood disease proves destructive to life in by far the larger number of cases.

"The attention of the Society has often been called to the malignancy and fatality of the malady by myself under the now scientific name by which it is known, viz. *Hæmatosepsis*—a septic condition of the blood.

"Like other maladies in which the blood undergoes changes affecting its vitality, science fails to a great extent to elucidate its several causes; but this much is known, that well-bred calves which are well cared for are more susceptible to the disease than others, especially between the sixth and the fourteenth or fifteenth month of their age. It is during this time that great care is required in the feeding of the young animals, and in the selection of their food. Turnips and all succulent vegetable matter ought to be sparingly given, especially in a season like the present. Experience has proved also that much good may be done in the way of prevention by the use of saline agents, such as common salt mixed with the food. An occasional saline aperient, and a few doses of an ordinary antiseptic, such as the hypo-sulphate of soda, will frequently prove prophylactic.

"Among herds, in parts of the country where the disease is very rife, it is the custom to bleed the calves once or twice in the year, to insert a seton in the dewlap, give some aperient medicine, and follow it by preparations of bark. These means are preventive, and to preventives we must chiefly look for good to be done in lessening the losses from 'black-leg.'—I am, my dear sir, very truly yours, "Jas. B. Simonds.

"H. M. Jenkins, Esq."

ORDER IN COUNCIL—FOREIGN CATTLE.

Schleswig-Holstein Cattle.

At the Council Chamber, Whitehall, the 27th day of February, 1874. By the Lords of Her Majesty's Most Honorable Privy Council. Present: Lord President, Mr. Secretary Cross.

The Lords and others of Her Majesty's Most Honorable Privy Council, by virtue and in exercise of the powers in them vested under the Contagious Diseases (Animals) Act, 1869, and of every other power enabling them in this behalf, do order, and it is hereby ordered, as follows:

(1) This Order shall take effect from and immediately after the 27th day of February, 1874, and shall cease to have effect from and immediately after the 30th day of November, 1874.

(2) This Order may be cited as the Schleswig-Holstein Order of 1874.

(3) This Order extends to Great Britain only.

(4) In this Order—

The Act of 1869 means the Contagious Diseases (Animals) Act, 1869:

A defined part of a port means a part of a port defined by a special Order of the Privy Council in pursuance of Regulation 2 of the fourth schedule to the Act of 1869:

Landing-place for slaughter means a landing-place within a defined part of a port:

Master includes any person having the charge or command of a vessel:

Other terms have the same meaning as in the Act of 1869.

(5) Notwithstanding anything in the Foreign Animals Order of 1871, the regulations in the fourth schedule to the Act of 1869 shall not apply to cattle brought from a port in either of the parts of the German Empire respectively known as Schleswig and Holstein.

(6) Cattle brought from a port of Schleswig or of Holstein shall not be landed elsewhere than at a landing-place for slaughter, unless and until the owner, agent, or charterer of the vessel in which they are brought has received the special permission of the Privy Council to employ the vessel in the trade of importation of cattle from ports of Schleswig and of Holstein or of either of them under this Order.

(7) The landing of cattle brought from a port of Schleswig or of Holstein, elsewhere than at a landing-place for slaughter, shall be subject to the following conditions:

First, that the vessel in which they are imported has not, within three months before taking them on board, had on board any cattle exported or carried coastwise from any port in any part of the German Empire, other than Schleswig or Holstein, or from any port of any of the following countries, namely:

The dominions of the Emperor of Russia.
The Austrian-Hungarian Empire.
The dominions of the Sultan.
The dominions of the King of Italy.
The dominions of the King of the Hellenes.
Belgium.
France.

Secondly. That the vessel has not, since taking on board the cattle imported, entered any such port as aforesaid.

Thirdly. That the cattle imported have not, while on board the vessel, been in contact with any cattle exported or carried coastwise from any such port as aforesaid.

Fourthly. That the cattle imported are accompanied by a declaration and certificates, such as are indicated in the forms set forth in the schedule to this Order, or to the like effect.

(8) Further, cattle brought from a port of Schleswig or of Holstein shall not be landed elsewhere than at a landing-place for slaughter, unless and until—

1. The owner or charterer of the vessel in which they are imported, or his agent in Great Britain has entered into a bond to her Majesty the Queen, in a sum not exceeding one thousand pounds, with or without a surety or sureties, to the satisfaction of the Commissioners of her Majesty's Customs, conditioned for the observance of the foregoing conditions in relation to cattle to be landed under this Order from the vessel; and
2. The master of the vessel has on each occasion of importation of cattle therein satisfied the Commissioners of her Majesty's Customs, or their proper officer, by declaration

made and signed or otherwise, that none of the cattle then imported therein have been exported from any port in any part of the German Empire, other than Schleswig or Holstein, or from any port of any of the other countries named in article 7 of this Order, and that the foregoing conditions have been observed in relation to all the cattle then imported therein.

(9) If the Veterinary Inspector of the Privy Council is of opinion, on the examination of any cattle imported under this Order, that the declaration accompanying the cattle is untrue in any particular, as regards any one of the cattle in the vessel, then all the animals in the vessel shall be detained and dealt with in accordance with instructions from time to time given by the Privy Council.

(10) If the declaration accompanying any cattle imported under this Order is untrue in any particular, as regards any one of the cattle to which it relates, the master of the vessel shall be guilty of an offence against this Order, unless he shows to the satisfaction of the justices before whom he is charged that he did not know of the same being so untrue, and that he could not with reasonable diligence have obtained such knowledge.

(11) Subject to the provisions of this Order all the provisions of the Foreign Animals Order of 1871 shall continue to apply to cattle brought from a port of Schleswig or of Holstein.

ARTHUR HELPS.

Veterinary Jurisprudence.

NORTHAMPTON ASSIZES.

THE SALE OF IN-CALF HEIFERS ON WARRANTY.

Before Mr. Justice BLACKBURN.

LANE *v.* TOUGH.

Mr. Metcalfe, Q.C., and Mr. Graham, instructed by Mr. C. C. Becke, for plaintiff, and Mr. O'Malley, Q.C., and Mr. Mayd, instructed by Mr. H. C. Passman, Leamington, for defendant.

This was an action brought to recover £36 15s. for keep of a number of heifers, consequent on an alleged breach of warranty. Plaintiff is a farmer and extensive dairyman, who supplies milk to the London market, residing at Newton Longueville, near Bletchley, and defendant is farm-bailiff to the Earl of Warwick, and occupies the Heathcote Farm, near Leamington. In November, 1872, plaintiff having heard that defendant had a lot of "down-calf"

heifers to dispose of, communicated with him that he would become a purchaser. A few days afterwards he went to Leamington, and was met at the station by the defendant, who drove him to the farm to see the heifers. Sixteen were at first shown him, and, as he alleged, they were warranted to calve within two months. He then asked him whether he had any more to dispose of; defendant replied that he had, and drove him about a mile, to where ten other "down-calf heifers and a cow were grazing. These last ten, he alleged, defendant said were nearer "their time" than the former lot, as they had been picked out from the whole number, and placed by themselves on that account. He agreed to purchase, the bargain being for 20 guineas each for the first sixteen, and £23 each for remaining ten and cow, and immediately drew a cheque for £500, leaving £89 balance. After the deal they had lunch together at defendant's house, and then drove to Warwick market, where plaintiff gave defendant a cheque for the balance. The following day, however, he stopped its payment for the reason, as he now stated, that he thought £500 sufficient to be paid on account, and until he had proved whether the heifers would turn out as warranted. They did not fulfil the warranty; some of them, in fact, did not calve for five months, while three proved barren. It was for the cost of the keep at 5s. per head per week of each heifer that went in calf beyond the time specified that the action was brought. Defendant had agreed to allow 30s. for each heifer that proved barren, and had paid £6 into court.

Mr. Metcalfe having stated these facts to the jury, called the plaintiff, *Joseph Willington Lane*, who stated that he is a farmer and dairyman, at Newton Longueville, near Bletchley. Having heard that defendant had a lot of "down-calf" heifers for sale, he wrote to him on the 13th of November, telling him that if he had he would become a buyer. Two days afterwards he went to Leamington, where the defendant met him at the station, and drove him to the farm. He told him on the way that he wanted milking cows, as he supplied milk to London by contract. Defendant asked him how many he wanted, to which he replied that he was not particular if they suited him. He drove him to a field in which were sixteen heifers, and as soon as he saw them he told him he thought they would "lie a long time," and that he wanted "down calvers," meaning heifers that would calve directly. In answer, defendant said they would all calve within two months. He depended on his word, and agreed to give him 20 guineas each for them. He then asked him whether he had any more to dispose of, and he drove him about a mile to a field in which were ten other heifers grazing, which he said had been drawn out from the other lot as being nearer for the time of calving. There was a cow among the last lot, and he agreed to give £23 each for the heifers, including the cow. From thence they went to a small public-house in Warwick, where a deal was completed, and he gave him a cheque for £500, leaving £89 balance. After this they went to luncheon, and next drove to Warwick market, where he gave him a cheque for the balance. On

the following morning, however, he stopped the payment of the last cheque, considering that £500 was sufficient to pay on account. A number of the heifers were removed to his farm, and, about a month afterwards, he wrote to him complaining that they did not turn out as warranted. To that he received the following reply:—"Dear Sir,—I beg to inform you that the heifers must be removed this week, and a cheque for the balance, £89, placed to my credit at the bank before Saturday." He answered that letter, though he could not speak to the posting of his answer, and his letter was accordingly not put in, and in reply he received a letter from Mr. H. C. Passman (defendant's attorney) to this effect: "Sir, I am instructed by Mr. Tough to apply to you for immediate payment for the amount of cheque paid to him from you by return of post, together with 5s. costs for this application, or I am instructed to commence legal proceedings. I am also to inform you that ten of the heifers which remain are at your risk, and that the sum of 5s. per head per week will be charged for their keep from the 16th December, the date on which they should have been removed." He wrote in reply, and on the 11th of January he went to see defendant at his house, where he told him the only reason he had for keeping back the £89 was to see that the heifers turned out really according to agreement. He also told him that only three of the seventeen he had received had calved; but the only reply he made was that they ought to have done. He told him he should expect him to keep the remaining ten free of charge up to the time they were about to calve, respecting which he signed the following agreement: "I hereby agree to keep the ten heifers belonging to Mr. Lane up to the time of calving, and will allow 30s. each for those that do not calve. The letter he wrote defendant, in answer to Mr. Passmann's, was here put in, and was to this effect: "I have received a letter from some lawyer of yours. I think it is a great pity if we cannot settle our difference without such men as those. I only want what is right, and am willing to refer what there is between us to any business man, either Mr. Margetts, Mr. Slaite, or anybody else. I shall be at Warwick on Saturday next, and if the men we may appoint think it right I will pay 5s. or 10s. per head for keep. I think I have more cause to be dissatisfied, and also to make a claim for compensation, as the heifers lay so long over the time named. There will be no difficulty about settling this small matter." On the day he saw him after sending this he paid him the £89. A fortnight afterwards he received six of the ten heifers, and a fortnight later the remaining four. On the 3rd of March he wrote him: "I received the four heifers yesterday, stated in your note of the 28th February to be in calf. If so, why did you send them yet? as I will guarantee three of them will not calve for four months. As I have stated in my letters to you before, I shall expect compensation, so many lying so long over the time agreed upon for them to calve. It is time some agreement was come to, and I request you to give me compensation according to your own terms of 5s. per week for keep. I consider I have a

claim upon you at that price for the heifers that went beyond the time specified, in all amounting to £36 15s. You will perhaps send me a cheque for that amount, as I shall prefer not taking legal proceedings unless you compel me to do so." After receiving the heifers they calved in the following manner: 11th Jan., three; Feb. 1st, three; Feb. 15th, four; March 6th, four; March 30th, one; March 31st, one; April 5th, six; April 12th, two; and three proved barren. He charged 5s. per week for keep per head for the animals that went beyond the time they were warranted to calve, in all amounting to £45 5s., from which was to be deducted the charge for defendant's keep, according to agreement, leaving his claim at the amount stated. In addition to that he had sustained a loss by the heifers not supplying him with milk at the time he expected they would have done, and also on the depreciation in the value of the animals, which he computed at £5 per head, on account of their having been thrown out of the season this year, consequent on their late calving. He estimated his loss on milk sale at £100, but he had not charged for that, nor for the depreciation of the animals in value.—By *Mr. O'Malley*: An animal "down calving" meant that it would calve in a week or ten days. These animals were not so near calving as that.—After expressing his doubt about it, defendant said he would warrant the whole lot would calve within two months of that time. He gave him the cheque for £500 at Warwick, afterwards he gave him the cheque for the balance, and he then returned him the "luckpenny" on the deal—£2. He did not remember him complaining to him that he had made a bad bargain, and denied that the memorandum whereby defendant agreed to allow him 30s. each for the heifers that proved barren was to be regarded as a settlement of his claim. He did not take legal proceedings until the other side had commenced to do so, and his solicitor then suggested that if defendant was acting for Lord Warwick in the transaction, and he desired him to take action against his lordship he would do so. Several of the heifers did not calve until April.

William Dickens proved to attending two of the heifers in calving in the second week in April.

In cross-examination he denied having told defendant that the whole lot calved within eleven weeks of the time they were bought.

William Martin and William Bliss were called to speak of the term "down calving," which they said meant that the animal to which it was applied would calve within a week or ten days.

This was plaintiff's case.

In opening for defendant, *Mr. O'Malley* said it entirely turned on the credit the jury would give to each of the witnesses—the plaintiff on one side, and the defendant on the other. Defendant, who had been farm bailiff to the Earl of Warwick for many years, might have defended the action on the ground that he was agent to that nobleman in the transaction, but he did not wish to throw it upon Lord Warwick, and was quite willing and ready to undertake the responsibility of it himself. *Mr. O'Mallley* reviewed the

facts of the case and the correspondence, and contended that plaintiff's story was an improbable one, and that it was not likely that defendant would warrant a lot of heifers to calve within a given time, when it was not the custom to do so, and about which he could have no positive knowledge.

Defendant, *David Tough*, stated that he was farm bailiff to the Earl of Warwick, and occupies Heathcote Farm, near Leamington. Early in November he received a letter from the plaintiff, stating that he had heard from Mr. Harwood, that he (the defendant) had a lot of heifers to sell, intimating that he would become a purchaser, and naming a day when he would be at Leamington. He accordingly met him at Leamington on the day fixed, and then drove him to where the heifers were. In the first field there were sixteen, and on going into it he said, "They are a nice lot of heifers," and asked what time the bull was put amongst them. He told him the first or second week in March, and he then further asked him what time they would calve, to which he answered that he did not know, and, in reply to a further question, said the bull was taken from them in the harvest time. He told him that it appeared to him that a good many of them would calve in two months. He did not ask him to specify the time when they would do so, nor did he give a warrant to that effect. He agreed to purchase the heifers, and also ten others in another field, together with a cow in the last lot, the price agreed upon being £589, and the delivery of the whole lot to take place within a month, he (defendant) to be at the cost of their keep during that time. They went to Warwick, and concluded the deal in the Wheatsheaf public-house for £589, plaintiff giving him a cheque for £500. Afterwards they went to his house, where they had luncheon, and next drove to Warwick-market. On going there plaintiff said he had better give him a cheque for the balance, and then he could return him the "luck penny," and then the purchase would be completed. He gave him the cheque, and he returned him 30s. as the "luck penny," but not being satisfied with that he gave him £2. On the following Tuesday he received a letter from the bank, and was surprised to learn that the cheque for £89. had been stopped. He wrote to plaintiff respecting it, and in reply he said he thought it better on second consideration to stop the cheque until such time as the beasts were removed. On the 2nd of January he wrote to him demanding payment, but between that time and the 11th he received no answer, and he then instructed his solicitor to write to him, in reply to which he (defendant) received a letter stating that it would be a hard thing if they could not settle their differences without putting it into a lawyer's hands. Afterwards he saw him, and in reference to the same subject he told him that it was his own fault that he had received a lawyer's letter, as he should not have stopped the cheque for £89. He replied that he had made a bad deal over the heifers, but that he had brought him the money that day. He also asked him whether he would allow him anything if any of the heifers proved not to be in calf, and he replied

that he would allow him 30s. for each heifer that proved barren. A memorandum to that effect was left with his sister, but he did not sign it. On the 4th of March he received a letter from the plaintiff claiming compensation for the keep of the heifers beyond the time, as he alleged, he went over to plaintiff's farm, but did not see him. One of his cowmen told him that the heifers had calved within eleven weeks from the time of purchase, with the exception of three or four that proved barren.—In cross-examination defendant still denied that he ever warranted the heifers to calve within a particular time. He admitted agreeing to allowing 30s. each for those that proved barren, and had paid £6 into court. Plaintiff never suggested to him that the difference between them should be put into the hands of an arbitrator.

Mr. O'Malley addressed the jury for the defendant, and *Mr. Metcalfe* for the plaintiff. The learned judge reviewed the evidence to the jury, who retired to consider their verdict. After an absence of about an hour they found for the defendant.

COVENTRY COUNTY COURT.

March 10th, 1874.

Before R. Harrington, Esq., Judge.

CASE OF BROKEN WIND.

Harrison *v.* Cattell.

Mr. Joseph Homer appeared for plaintiff, and Mr. Oliver Minster for defendant.

Claim brought for £12 14s. 6d. and costs, being the difference between price paid and sum realised by the sale of a black half-bred mare at auction.

Plaintiff deposed that on September 9th, 1873, he purchased a black mare, said to be sound, from the defendant for £16, and had five shillings chap-money; on the following conditions, viz.—that should the mare not prove a good worker and suit him, he should return her in three days with half-a-sovereign, the defendant agreeing to take her again.

At the expiration of a week the plaintiff sent the mare back, stating that her wind was bad, and that he would give half-a-sovereign to settle the matter. Defendant refused, and took a legal opinion, in consequence of which the plaintiff allowed the matter to rest. He then sold the mare to a Mrs. Wildsmith, at a small profit, saying that she was sound, and that he had had her examined by a veterinary surgeon.

The plaintiff went on to state that some time afterwards, Mrs. Wildsmith sent for Mr. A. B. Proctor, veterinary surgeon, to examine the mare, who pronounced her unsound, and as I would not accept her when tendered, the mare was sold by auction for £5, and an action brought against me in this court for the amount paid and

costs. It was decided by a jury against me. I then brought this action against the defendant to recover the original cost of the animal, less sale with expenses.

Cross-examined.—Being partially blind I am obliged to depend on others. Kept this mare at work in my possession three weeks, trapping and hauling stone. Did not warrant her to Mrs. Wildsmith, although she has stated otherwise. Did not tell Sam Pettifer that the mare was a good worker, but slow, and that I was satisfied with her.

Thos. Lenton heard Cattell say that the mare was sound, except of her fetlock joint, and if Harrison did not like her, he was to give half-a-sovereign and send her back in a few days.

Harrison, jun.—Heard my uncle ask defendant if the mare was sound. He said yes, with the exception of the fetlock joint, and she does not go lame of it—£15 was offered and refused. Uncle bought her for £16. Mare was in good condition at this time.

A. B. Proctor.—Examined the mare on 9th November, 1873. In my opinion she was broken-winded, had two spavins, and a sprained fetlock joint. These must have existed many weeks prior to sale. Cross-examined—Animals from an acute attack of inflammatory disease become broken-winded in a few days. Bone spavins sometimes form in a month; these were of long-standing, and could not be mistaken for coarse hocks.

Joe Cattell.—I am a licensed victualler in this City, and on the 8th September, 1873, I sold Harrison a black mare for £16, and five shillings chap-money, which he spent in drink before he left. Nothing was the matter with the animal except an enlarged fetlock joint; did not warrant her sound, but offered to take her back in three days if she did not suit plaintiff, on giving me ten shillings. Never saw the mare or Harrison again. Homer sent me a letter to say the mare would be sold by auction at the King's Head Yard, but I took no notice of it. No application was made to me by plaintiff to take the mare again between time of sale to Mrs. Wildsmith and bringing this action. There was nothing the matter with the animal when I drove it to Leamington and other places prior to selling it.

Wm. Morris.—Was in Cattell's yard at the time of sale when the bargain was struck at £16, and five shillings again. Defendant gave no warranty in my presence, but agreed to have the mare back again in three days if she did not suit, ten shillings to be allowed. Certainly the animal was not broken-winded. Have bought and sold many horses in my time. This mare was very poor when sent to auction. Have seen this animal twice lately, she does her work well and feeds right. Cross-examined.—Nothing was said by Harrison about the mare's wind, nor any allusion made by any one respecting it. I did not cough the mare, nor did the defendant. I know a little about horse dealing.

John Morgan was present at the deal in September. Harrison said, all I want is an animal to work quiet and well. Met plaintiff three weeks after in the street; asked how mare suited? He replied, very well, but she is a slow worker. Heard no warranty given.

Sam. Pettifer.—Was in the bar at Cattell's at the time of settling, and heard the conversation that ensued; no warranty express or implied was given. Asked Harrison in Bishop-street some three weeks after purchase, how mare suited? He replied, well, but she is very slow. Cross-examined.—Was not with Morgan when he met Harrison, and asked him the question.

Mark Omer had been working this mare for the past seven to eight weeks, at Wyley's, of Charterhouse, carting soil on the pastures; each load would be about 35 cwt.; distance to the end of the field, would be quarter of a mile; the animal performed her work well, did not cough, and was not broken-winded. Was in full work daily. Had corn and chaff twice a day; turned out at night. Mare lent to his master for her keep, by Walters, the owner, who purchased her at the hammer.

Mr. J. Norfolk.—Examined the mare at Wyley's, on January 5th, 1874, in defendant's presence. In my opinion, she is not broken-winded, nor is she touched in the wind. I believe her to be a usefully sound animal. Cross-examined.—I differ in opinion from Proctor. Had her taken out of the cart, coughed her and examined her, gave certificate to afore-mentioned facts.

Wm. Furnivall.—Examined the black mare at Charterhouse, on January 16th, 1874, in the presence of defendant, at his request. Gave a certificate stating that the mare was not broken-winded, nor had she any affection in her wind, and was usefully sound for work, her coarse hocks notwithstanding. Cross-examined.—Am not on friendy terms with Proctor, never speak to him. Have had no litigation with him, but have appeared before the magistrates to give evidence against him. Saw this animal at work in a cart before giving an opinion. By the Judge.—Saw nothing of the jerk of the abdominal muscles indicative of the malady.

His Honour summed up, after retiring to his private room to consider his notes, and gave a verdict for the defendant.

WARWICK, Feb. 27.

(Before Baron Pollock and a Special Jury).

Horse-dealing Transactions.

COBLEY *v.* GREGG.

Mr. Field, Q.C., and *Mr. Lumley,* were for the plaintiff; *Mr. Waddy,* Q.C., for the defendant.

This action was brought for the breach of a warranty of a horse. It appeared from the plaintiff's case that Mr. Cobley is a dressing-case maker living in Birmingham, and that in July last, wanting a horse for his brougham, he answered the following advertisement, which had been inserted in the newspaper by the defendant, who is a horsedealer, also living in Birmingham:—"A very handsome brougham horse for sale, the property of a gentleman; trial allowed."

The plaintiff agreed to purchase the horse for £105 on his vete-

rinary surgeon's approval. The examination being satisfactory, the plaintiff bought the horse. Two days after the horse went lame, and on his shoes being taken off it was found that he was suffering from bad corns in his near forefoot. The plaintiff called on the defendant, and according to his account, the defendant agreed to take the horse back and give another in exchange. A fortnight after the horse was taken back and another sent in its place, which the plaintiff said was a jibber. This horse was accordingly returned, which the plaintiff stated was broken-winded. The defendant then agreed to let the plaintiff have a pair of horses for £160, but when they were brought to his stable it was found that one was broken-kneed and the other seventeen years old. The plaintiff then commenced legal proceedings to recover the £105, and the defendant sent in a bill for the hire of the horses and the keep of the first horse which had been returned, and also stated that the horse would be sold unless the money was paid, which he subsequently was for the sum of £43. At the end of the opening of the plaintiff's case,

His Lordship stated that the inquiry ought to be confined to the soundness of the first horse and the question as to what the agreement was when the horse was returned. According to the defendant's statement, the plaintiff agreed to purchase the horse on the surgeon's certificate, and he had never agreed to take the horse back as a "returned horse," as the injury had arisen since the sale, but that he only agreed to take back the horse to sell for the plaintiff. Witnesses were also called to prove that the horse was sound at the present time.

The Jury found a verdict for the plaintiff.—Damages, £105.—*Times.*

ROYAL COLLEGE OF VETERINARY SURGEONS COLLEGE FUND.

The following additional Subscribers to the Fund for Building or purchasing suitable premises as Offices of the College completes the List to March, 1874.

	£	*s.*	*d.*
Carter, Joseph Shepherd, Esq., President of the Yorkshire Veterinary Medical Society, Bradford	2	2	0
Cuthbert, John, Esq., Leeds	2	2	0
Broughton, William, Esq., Leeds	2	2	0
Fitzwygram, Col. Sir F. W., Bart., London . . .	210	0	0
Lambert, John, Esq., 17th Lancers, Dublin . . .	2	0	0
Merrick, Thos. Jas., Esq., Northampton	5	5	0
Yorkshire Veterinary Medical Society	50	0	0

NEW VETERINARY COLLEGE, EDINBURGH.

Sir Frederick W. Fitzwygram, Bart., late Colonel 15th Hussars, author of various works on horses, stable management, and horse-shoeing, who has just returned from India, has, by way of encouragement to this Institution, given £25 to be distributed in prizes among the students at the approaching examination.—*The Scotsman.*

EDINBURGH VETERINARY COLLEGE.

A private meeting of the Dick Trust was held Friday, March 13th, Lord Provost Falshaw presiding. It appeared from the minutes of the Committee of Management which were read, that there was a deficiency of about £500 in the sum available for working the College, owing to the greatly lessened amount of fees drawn, caused by the falling off in the number of students. It had been agreed, with the consent of Miss Dick, that this sum should be taken from £2000 or £3000 at present lying on deposit receipt in the bank. The Lord Provost was elected a member, and, in virtue of his office, chairman of the Committee of Management, and factory and commission was signed in favour of his lordship. In answer to a question by Councillor Macdougald, it was stated that this was the same kind of factory as was signed in favour of Lord Provost Cowan.

The claim made against the Trust by Mr. Williams was remitted to a sub-committee. A report was read from the law agent for the trustees in reference to the action at the instance of the Veterinary Medical Society against the Trust. It seemed to be the feeling of a number of the trustees that access to the library should be granted to the members of the society; but, while they were disposed to be liberal in this respect, they agreed with the other members of the Trust in resisting any attempt of the society to found a right of property in the library, and they accordingly instructed the law agent to defend the action on behalf of the Trust. This was all the important business of the meeting.—*The Daily Review.*

ARMY APPOINTMENTS.

War Office; *March 6th*, 1874.

Veterinary Department.—William Olliver—gent.—to be veterinary surgeon on probation, in succession to acting veterinary surgeon B. A. W. Powell, promoted.

PRESENTATION OF A TESTIMONIAL TO ASSISTANT-PROFESSOR J. W. AXE, Royal Veterinary College.

The members of Mr. Axe's private class assembled in Crowndale Hall, on Wednesday evening, March 4th, for the purpose of presenting him with a testimonial, in recognition of his abilities as a teacher, and his untiring efforts to promote the advancement of the class in the several important branches of their studies.

The testimonial consisted of a beautiful marble "Timepiece," inlaid with Egyptian figures, and surmounted by a Sphynx in bronze. Accompanying it was a short address, to which the signature of each member of the class was appended.

Mr. A. C. Webb was deputed to make the presentation, a duty which he performed to the entire satisfaction of all present.

Mr. Axe, in a few but well-chosen observations, thanked the class for their kindness, and expressed the gratitude he felt for the honour they had done him in presenting him with such a token of their esteem, and appreciation of the endeavours which he so gladly made for their advancement.

OBITUARY.

We have to record the death of Mr. Robert Martin Holmes, M.R.C.V.S., Kirton-in-Lindsey, Lincolnshire. His diploma bears date April 23rd, 1867.

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Communications and Cases.

SCHWEINFURTH'S 'HEART OF AFRICA.'

By G. Fleming, M.R.C.V.S., Royal Engineers.

One of the most engrossing works of travel in Africa since the appearance of the lamented Dr. Livingstone's wonderful books is that of the German explorer, Schweinfurth, which has just been published, and which, like Livingstone's volume, contains very much that is interesting to the veterinarian in a zoological and medical point of view; while to the general scientific and ordinary reader it is replete with the most varied and valuable information. Perusing this splendid contribution to geographical and ethnographical knowledge as a veterinarian, I have made the following extracts, which may possess as much interest for others as they do for myself. Having for many years anxiously perused books of travel, and others, for information with regard to the natural history, breeds, and management of the domesticated animals in every region of the globe, but more especially with the object of ascertaining the geographical distribution of their various diseases, I have been particularly impressed with the value of the facts with which intelligent and, above all, scientific travellers can furnish us.

Comparative pathology is made up of facts and observations, and it should be looked upon as comparative not only with regard to species, but also to geographical situation. Not only this, but considering the reputation of Britain as the greatest colonising, travelling, and military expedition-

making nation in the world, it is of the greatest importance that we should be acquainted with everything concerning the climate, vegetable resources, kinds of domesticated animals, &c., of other countries, so that should circumstances carry us into them we may not be altogether ignorant of these matters. Hitherto we have not been well informed of them, and I might adduce as evidence of this our expeditions to North China and Abyssinia, and that just concluded to the Gold Coast.

The Army Intelligence Department is not well served, but as it is certain to be reorganised before long, now that its defects have become so noticeable, it is to be hoped that the veterinary section which it should contain will not be omitted, as it may be said to be all-important. The expedition to the Gold Coast nearly proved a terrible disaster from its being unprovided with transport animals, and if we had known more about the country this risk might have been obviated. It is, then, from such experience as that of Schweinfurth that we must obtain that knowledge which may serve us in extending our notions with regard to various points connected with our science and its utility in national undertakings.

The traveller penetrated beyond the Soudan into Nubia, and, in fact, reached the very "heart" of Africa, becoming acquainted with the Bongos, Dinkas, and other tribes possessing a high interest for the ethnologist and anthropologist.

Speaking of the effects of the climate upon the domesticated animals, he corroborates what Bruce has stated:—"It has been proved by experience that all donkeys, mules, horses, and camels succumb sooner or later to the effects of the climate. Camels invariably succumb to the climate in a very short time, and are, consequently, but rarely used as a means of transport." Cattle appear to thrive, however, in some regions, as we shall learn hereafter. Poisonous plants would seem to have some share in this premature mortality, as they, in all probability, also have on the Gold Coast. Schweinfurth tells us that—

"The most remarkable plant among the islands of the Meshera (Nubia) is a climbing passion flower, the *Adenia venenata*, the bright green leaves of which are applied by the natives of Central Africa for the purpose of drawing blisters. These leaves have, however, a poisonous property, which has proved fatal to camels. Camels have but a feeble faculty of smelling, and eat freely of whatever looks green, so that all attempts to acclimatise them here have been without success.

It is the same plant which deprived Sir Samuel Baker of his pack-ass in Latuka."

It is curious to note that in this part of the world, as in others, there are plants which, highly poisonous to some animals, are yet innocuous to others. Such is the "dragon-tree" or Nubian *Dracænæ*, the long flower stalks of which serve as excellent food for camels in June, while for goats they are almost poison.

The medical treatment of animals is, at any rate, simple, if it does not prove effective. "Whenever a horse or a donkey gets in any way sickly, it is compelled to swallow pieces of pork; this is considered as an infallible cure throughout the whole of Nubia, and in some of the heathen negro countries, where tame pigs are unknown, the flesh of the wild hog (*Phacochærus*) is used as a substitute. The practice in Zanzibar and in other places, subject to the Arabian semi-culture of introducing pigs into the stalls with the horses, for the purpose of attracting the devil from them into the swine, is unknown to the Nubians, but probably only for the reason that stalls do not exist in the Soudan."

The Dinkas appear to be an essentially pastoral people, and Schweinfurth's notice of them is, perhaps, the most attractive portion of the two large volumes of which the work is composed. We cannot do better than quote his own words with reference to their domesticated animals:

"The domestic animals are oxen, sheep, goats, and dogs; poultry was never to be seen, and the cause of its absence is inexplicable. The cattle belong to the zebra race, and are smaller than those of the Baggara and Hassanieh; they have a hump, their horns are slender, the fore part of the body prevailing so in size as to resemble an antelope. As to colour, the majority are nearly white, but it would be incorrect to say that either the speckled or the striped, the tawny or the brown, are wanting. The Dinka have separate expressions to denote every shade of colour of the breed, and, indeed, their vocabulary for all that relates to cattle and cattle breeding is more copious than that of any European tongue.

"The sheep are of a peculiar breed, which is unique amongst the Dinka, Nueir, and Shillooks; farther on in the interior of the equatorial districts it is not known. Its chief characteristic consists of a shaggy appendage to the shoulders, breast, and neck, like a mane, whilst on the rest of the body, and on the meagre tail, the hair is quite short. This mantle of hair gives them an appearance like diminutive buffaloes, while their plump bodies and short legs increase the re-

semblance. Generally white, they are occasionally brown or spotted, and in some rare cases I have seen them of quite a reddish hue. Like the pastoral people of Southern Africa, the Dinka have acquired the art of splitting the horns in their early growth, so as to increase their number at will. A fact of much interest connected with the Dinka sheep is the existence amongst them of entozoa, but particularly of Trematode worms.

"The continual dampness of the pasture, especially throughout the rainy season, favours the development of revolting intestinal vermes, and the rain-pools in the dry months become most prolific as breeding places for *Cercariæ*. I have frequently seen sheep suffering under disease, their ailment arising from their liver and gall-ducts being choked up by these worms. The distoma, which is a denizen of every zone, and extends even to Greenland, is found here an inch long. The partiality of this people for a bucolic existence, and their fondness for cattle, are almost unrivalled.

"Every idea and thought of the Dinka is how to acquire and maintain cattle; a kind of reverence would seem to be paid to them; even their offal is considered of high importance; the dung, which is burnt for ashes for sleeping in and for smearing their persons, and the urine, which is used for washing and as a substitute for salt, are their daily requisites. It must be owned that it is hard to reconcile this latter usage with our ideas of cleanliness. A cow is never slaughtered, but when sick it is segregated from the rest, and carefully tended in the large huts built for the purpose. Only those that die naturally or by an accident are used as food. All this, which exists amongst most of the pastoral tribes of Africa, may perchance appear to be a lingering remnant of an exploded cattle worship; but I may draw attention to the fact that the Dinka are by no means disinclined to partake of any feast of their flesh, provided that the slaughtered animal was not their own property. It is thus more the delight of actual possession than any superstitious estimate that makes the cow to them an object of reverence. Indescribable is the grief when either death or rapine has robbed a Dinka of his cattle. He is prepared to redeem their loss by the heaviest sacrifices, for they are dearer to him than wife or child. A dead cow is not, however, wantonly buried; the negro is not sentimental enough for that; such an occurrence is soon bruited about, and the neighbours institute a carousal, which is quite an epoch in their monotonous life. The bereaved owner himself is, how-

ever, too much affected at the loss to be able to touch a morsel of the carcase of his departed beast. Not unfrequently, in their sorrow, the Dinka remain for days silent and abstracted, as though their trouble were too heavy for them to bear.

As an illustration of the degree to which the Dinka devote all their attention to cattle breeding, and find their chief delight in it, it may be mentioned that the great amusement of the children is to mould goats and bullocks out of clay.

The only domestic animal which is slaughtered amongst them is the goat, which scarcely represents the thirtieth part of the value of a cow. A heifer has three times the value, and a cow that has calved double the value of a steer.

In common with the other tribes of this part of Africa, they use rather a singular method of butchering their cattle, proceeding, whenever it is practicable, by the way of making a violent stab in the nape of the neck by means of a spear. This causes immediate death, and is a method which gives but little trouble.

The practice of emasculating their cattle is carried to an extreme degree, and Schweinfurth makes some interesting comments upon its results:—"It is difficult to understand how people like the Dinka should make their whole delight to centre in having thriving cattle farms; but to us their profitless practice of emasculation must remain incomprehensible. The herdsmen cut their bulls and bucks with the mere intention of feasting their eyes upon a development of fat, which is always obnoxious to the stomach. Almost the third part of their bulls are submitted to the knife, and the same proportion of their goats and rams, and even their dogs, with the design of rendering them more agile, more enduring, and fitter for the chase, this being also the reason why their ears and tails are clipped. Ask the Dinka what good they get from their possessions of oxen, and they have ever the answer ready that it is quite enough if they get fat and look nice. Such is the way in which they express their satisfaction and their pride.

"The failure of the beard amongst the male cattle so treated is a topic that suggests some observations. In spite of the anxiety and care which the Dinka bestow upon their herds, there is no mistake about the degeneration of the race. The way in which I chiefly account for this is that there is not enough crossing of breeds; in fact, that there is almost a total exclusion of any strange stock. I should say that hardly one in a hundred of the beasts is capable of either bearing a burden or going a journey—a purpose, however, to which

none of the negroes of the Upper Nile ever seem to put them; but nothing is more remarkable than the entire absence of fat which characterises them; a single pound of fat could not be obtained from a whole ox; and not only does this deficiency extend to the parts that are ordinarily plump and fleshy, but the spinal marrow itself is so utterly dry that in a stewpan it runs off like white of egg, without depositing a particle of grease. Eye-witnesses have assured me that Miss Tinné, during her residence here, although she had whole herds at her command, could never get her supply of pomade replenished."

The cattle receive no salt, and their unhealthiness and degeneracy is partly accounted for by this deprivation. It is some time before they can be induced to eat the condiment:

"The cattle of the Dinka are not provided with salt in any form whatever, which may in a measure account for the degeneration; it may explain the prevalence, all but universal, of the worms known as "kyatt," which cover the first stomach or paunch of nearly all their cattle. These worms, in Europe, are included in the genus of the *Amphistoma;* they are like an oval bag, something under an inch long, and generally as red as port wine."

The sheep and he-goats that are left are quite devoid of fat; their flesh, when it is cooked, has an odious soapy flavour, and is altogether more repulsive than the rankest roast antelope.

The absence of salt may also have much to do with the small yield of milk obtained from the cows. Schweinfurth remarks on this point:

"The milking is performed in the morning hours. Truly miserable is the yield, and the most prolific of the cows does not give as much as one of our ordinary goats. This deficiency of milk is another proof of the deterioration of the breed, and no one would believe the quantity of milk it takes to produce a single pound of butter."

As among the pastoral tribes of Central Asia, so among those of Central Africa, cheese is not made from the milk.

"Cheese, a product that is utterly unknown amongst the pastoral tribes of Africa, from the people of Morocco to the Bisharee on the Red Sea, and from the Drinka to the Kaffirs, is imagined to be composed of pigs' milk—a fact which accounts for the predilection of Europeans for it."

In this region the cattle have their plagues almost as severely as in more civilised countries, though what their nature may be we are left in doubt, Schweinfurth knowing

even less of comparative pathology than Livingstone. He says:

"During the rainy season of 1870, the Dinka cattle were decimated by various plagues, and the district of the Lao was especially ravaged, old Shol (a princess) losing some thousands of her stock. The most common of these cattle plagues was called 'atyeng' by the Dinka, showing itself by open wounds like lance cuts in the hoofs; sometimes the wounds would make their appearance on the tongue, rendering the animal incapable of grazing, so that it could get no nourishment, and sank through exhaustion. Another malady, called 'abwott,' to which only the cows are subject, consists of a swelling which affects the uterus, and carries them off in a night. A third, known as the 'odwangdwang,' appears just as contagious, though not so generally fatal as the two former. The animals refuse their food for forty-eight hours, but, under favorable circumstances, on the third day commence grazing again."

The first of these maladies may have been "aphthous fever," which is known, as is also contagious pleuro-pneumonia, in South Africa.

The Bongos, another interesting tribe visited by Schweinfurth, are not moved by any scruples of taste in the matter of food, and they must, one would imagine, prove very accommodating hosts to myriads of parasites.

"Whenever my cattle were slaughtered, I always saw my bearers eagerly contending for the half-digested contents of the stomach, like the Esquimaux, whose only idea of vegetables appears to be what they can obtain from the contents of the paunches of their reindeers; and I have seen the Bongo calmly strip off the disgusting amphistoma worms which literally line the stomachs of all the cattle of this region, and put them into their mouths by handfuls. After that it was not a matter of surprise to me to find that the Bongo reckons as game everything that creeps or crawls, from rats and mice to snakes, and that he is not particular what he eats, from the carrion vulture to the mangy hyæna, or from the fat earth-scorpions (*Heterometrus palmatus*) to the caterpillars of the winged termites with their oily beetle bodies."

Though Schweinfurth carefully describes and delineates the different breeds of dogs he observed, yet he says nothing of their diseases, nor yet whether rabies is known among them. In all likelihood that terrible malady is known in Nubia, as it is often prevalent in North Africa, though, according to all accounts, it has never been witnessed in Western or Southern Africa.

The dogs of the Nile district are deficient in the dew-claws of the hind foot, and the Nubians have some curious notions about them.

It is well known that most dogs have a few white hairs at the extreme tip of the tail; this tip they (the Nubians) declare must be removed, otherwise the animal will not thrive." Altogether their fancies about dogs are most absurd; they adhere to the belief that to inhale their breath would be followed by grievous consequences, and that the worst internal disorders, such as consumption and dropsy, would infallibly ensue. Every Nubian dreads hearing a dog howl, and I was not a little surprised at finding, in this remote land, a superstition that is common in many parts of Europe, and which I remember having met with in Hungary. The superstition to which I refer is, that whenever a dog howls (and that is not seldom, for it will do so on hearing a donkey bray) it betokens the approaching death of its master."

There is much more that is noteworthy in this magnificent work; but one more curious notice must suffice. Speaking of the Nubians, the traveller writes:—"One of their practices is as disgusting as it is strange. They suppose it will give them strength to apply the sweat of their horses to their own bodies. After a ride they scrape off the sweat from their horse's back with their hand, and rub it about their persons, just in the same way as if they were using one of their ordinary greasy ointments. All Mahommedans have peculiar ideas about what is clean and unclean. A horse is not an unclean animal, and therefore its sweat cannot be supposed to defile a man."

REVISED LIST OF ENTOZOA, WITH NOTES AND REFERENCES.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

The time has probably now arrived when we may with advantage not only offer a complete revision of the list of parasites infesting our domesticated animals, but when we may venture to popularise the scientific nomenclature, and thus render the subject more generally acceptable in the eyes of the busy practitioner. It is constantly asked by those who care only for practical matters, why every parasite

must needs have two scientific names attached to it, but the same inquirers forget that they themselves have often three or more names by which they may be distinguished from their fellows. I occasionally hear it said, "What is the use of knowing anything about the natural history of worms?" and then they add, "All that we have to do is to cure them." Exactly so. Persons who make such remarks at once reveal their dislike to all professional progress, especially if that advancement involves a little extra brain-work on their part. It is useless to waste time in argument: consequently, those of us who are otherwise minded continue to "cast our bread upon the waters," in full assurance that every new fact contributes something towards the general weal.

In this connection it has occurred to me to offer an English nomenclature that shall be sufficiently precise and distinctive to be currently employed by veterinarians, agriculturists, and others, who are constantly encountering these "worms" in animals. How much need there is for this may be understood from the circumstance that many persons, even professional men, speak of "the tapeworm" of the dog as if there were only one species. To be sure, in treatment, one drug may be obnoxious equally to a great variety of species belonging to the same family of entozoa; but since all the species have totally distinct modes of origination, and since, also, a knowledge of these modes of introduction into the parasite-bearer often enables us to check the propagation of the entozoon, it is clearly of the highest sanitary and prophylactic importance that some discrimination of specific forms should be exercised. To roll all the six separate and distinct tapeworms of the dog, for example, into one species, and to affect, as some do, a positive indifference as to their whence and whither, shows a voluntary abnegation of practically useful knowledge which is unworthy of any man presumedly desirous of advancing his own profession. Besides this, as a stimulus to work, there is the far less selfish motive of contributing to the welfare of those valuable animals that are directly subservient to our wants.

I trust I have said enough in the way of apology for the introduction of a professional catalogue, which in course of time I hope to see utilised by those most interested in the matter. No attempt will be here made to render this record an exhaustive summary of references; though, could I reckon on possessing the time necessary for its completion, I would seek to make it of more importance than its title implies. I cannot even venture to give more than a few of the more obviously diagnostic characters, which however it is hoped

will generally be found sufficient for all practical purposes. As I have incidentally alluded to the tapeworms, we may as well begin with them, but no strictly scientific classification will be introduced beyond that of a merely convenient and natural arrangement.

1. The Wrinkled Tapeworm (*Tænia plicata*).—This species varies from six inches to three feet in length. It has a conspicuously large and square-shaped head, succeeded by a very short neck. It is a comparatively rare species.

It infests the horse and ass, being found both in the stomach and small intestine.

Several specimens may be seen in the Museum of the Royal Veterinary College. In a manuscript volume of notes (on cases of entozoa, and on experiments conducted at the College several years since by Professor Simonds and myself) I find the following interesting entry. Under the title of *Tænia megalacephala*, which is a synonym of this species, Mr. Simonds writes: "A fine specimen of this worm was found in an ass (Feb. 23, 1865). It measured about nine inches in length, and three fourths of an inch in width at the broadest part. The head had a diameter of one fourth of an inch."

Figures of the worm have been published abroad (Abildgaard, Bremser, &c.).

2. The Leaf-shaped Tapeworm (*Tænia perfoliata*).—This parasite varies in length from one to three inches. It has no trace of a neck, properly so called, and it is readily recognised by the lanceolate form of the body, and especially by the presence of small lobed prominences situated at the base of the head, two on either side.

Infests the horse and ass, inhabiting the cæcum and colon, being also found, though more rarely, in the duodenum and other parts of the small intestine.

Published Cases.—Mr. Poulton, in the *Veterinarian* for 1866, p. 385. In this case the severe and fatal symptoms were not exclusively due to the "large quantities" of this tapeworm, as other entozoa were present.

Specimens.—In the Museum of the Royal Veterinary College, and in the Hunterian Collection, Lincoln's Inn (Nos. 159 and 160). In the MS. note-book, already referred to, I find two entries pointing to the occurrence of this species in the ass. Three specimens were "obtained from a donkey killed for dissection," on the 21st of February, and "twenty" others on the 27th of the same month, in 1865.

Figured by Pallas, Bremser, Goeze, Gurlt, Blanchard, &c.; and in the author's 'Manual,' p. 110.

3. The Mammillated Tapeworm (*Tænia mamillana*).—This worm bears a very general resemblance to the above; but it is a much smaller species, attaining only the length of half an inch. It is further recognised by the wedge-shaped form of the joints or divisions of the body, each of which is furnished with a prominent reproductive papilla.

Infests the colon of the horse.

Specimens wanted in England.

Figured by Gurlt.

4. The Long Tapeworm (*Tænia expansa*).—Reported to be capable of attaining 100 feet in length, it is not surprising that this worm should have been confounded with the broad tapeworm of man. Apart from its size, the parasite is readily distinguished by the presence of prominent reproductive papillæ on either side of each of its body-segments. The head is destitute of hooks.

Infests the small intestines of the ox and sheep.

Published Cases.—Presumably referable to this species is the account given by Mr. Cox of tapeworms causing an epidemic amongst lambs, in which hundreds of animals perished (the *Veterinarian*, 1855, p. 446).

Note.—In a private communication recently received from Dr. Joseph Fleming (who has been acting as Pathologist in connection with the Army Medical Staff during the Ashantee war, and who has previously contributed to advance our knowledge of parasitism as it occurs in India) I find the following remark: "In Cape Coast Castle I was told that sheep, goats, &c., were very subject to parasites; but I only managed to obtain one specimen from a sheep—a hookless tapeworm."

According to a communication recently received from Mr. Rees Lloyd, of Dowlais, Glamorganshire, this parasite may prove fatal to its bearer within the space of a few hours. Several ponies have been found dead from this cause, "one farmer having lost ten."

Specimens.—In the Royal Veterinary College and Hunterian Museums; also in Prof. Brown's Collection, and in the Museum attached to the Middlesex Hospital.

Figured in the author's 'Manual' (p. 20) from Goeze. Illustrations originally appeared in the paper by Carlisle, published as far back as the year 1794 ('Linn. Trans.,' vol. ii), other figures being given by various foreign writers (Bloch, Gurlt, Mayer).

5. The Toothed Tapeworm (*Tænia denticulata*).—Compared with the above this is a small parasite, measuring from eight to sixteen inches in length. The head is square-

shaped and unarmed, and there is no recognisable neck. Like the foregoing, it is furnished with a double set of reproductive outlets marked by papillæ, one on either side of each segment.

Infests the small intestine of the ox.

Specimens exist in the Museum of the Royal Veterinary College. These are very fine examples.

Figured by Gurlt.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from p.* 230.)

The Rutales.—The Rutal Alliances has the following:

Diagnosis.—*Hypogynous exogens with monodichamydeous symmetrical flowers, axile placenta, an imbricated calyx and corolla, definite stamens, and an embryo with little or no albumen.*

In this alliance are grouped together a very large though a very natural series of plants—so much so, indeed, that Professor Lindley tells us that—

"The larger plant of this alliance might and even has been regarded as no one natural order, and by all botanists the members of it are placed in very close relationship."

The importance of this group of plants may be gathered, not only from the central position occupied by them and the general beauty and utility of so many of its members, but from the large number of genera and species which enter into its composition; thus we have grouped in the *Rutales* no less than thirteen natural orders containing 235 genera, and including 1225 species.

It will, then, hardly be expected that we shall here deal at all minutely with such a mass of material, as our present object will be best attained by reviewing three out of the thirteen natural orders, which will be distinguished as follows:

1. Aurantiaceæ — Citronworts. — *Fruit consolidated, succulent, indehiscent; petals imbricated; stamens free, or nearly so; leaves dotted.*

2. Rutaceæ—Rueworts.—*Fruit finally apocarpous, few-seeded, with the pericarp separating in two layers.*

3. Simarubaceæ—Quassiads.—*Fruit finally apocarpous,*

one-seeded, with the pericarp not laminating, and a dry, inconspicuous torus.

Curiously enough, none of them are natives of Britain, though many of them are cultivated with us, and all are esteemed for qualities of importance, their prevailing principles being acids, bitters, and aromatic essential oils, which in one resides in the fruit and rind, in others in the bark, and some only in the roots. The flowers of many are highly perfumed, and the leaves of most are full of aroma.

1. *The Citronworts* are well known to us through oranges and lemons—fruits which are among the most grateful and useful of any we possess—fruits the juices of which are as welcome to the invalid as to the strong man, while their rind is used as an adjunct to different medicaments.

Every part of the plants is replete with some grateful essence, and the beauty and perfume of the flowers of the orange tree cause them to possess the one great charm in the bridal bouquet.

The well-known "orange" as a fruit is probably more extensively partaken of than any other kind of fruit known.

Lindley says that the productiveness of the common orange is enormous. A single tree at St. Michael's has been known to produce 20,000 oranges fit for packing, exclusively of the damaged fruit and the waste, which may be calculated at one third more.

Both oranges and lemons grow very well in our greenhouses, and are agreeable, beautiful, and handsome, in every stage, but are not of any use as fruit-growers.

2. *The Rueworts* are well known to us through the common garden plant, *Ruta graveolens*—rue—the typical plant of the order, of which the following popular description is given by Dr. Maxwell Masters:

"Ruta.—This genus gives its name to the order *Rutaceæ*. The species are herbs or undershrubs, natives of the temperate regions of the eastern hemisphere. They are beset with small glands containing a powerfully smelling oil; they are pinnate or much divided. The flowers are yellowish or greenish, and arrayed in terminal corymbs or racemes. The calyx has four persistent sepals; the petals are four concave, the stamens eight; ovary four-lobed, on a short, thick, disc-like stalk, at the base of which is a ring of eight glandular pores; style one; fruit capsular; four-celled, with six to eight seeds in each cell.

The common rue—*R. graveolens*, a native of the south of Europe—is commonly cultivated in this country. It is a somewhat shrubby plant, two to three feet high, with pin-

nately divided bluish-green leaves and yellowish flowers disposed in corymbs. The first flower open has usually ten stamens, the others eight only. These stamens are of unequal length; each is bent inwards in its turn to touch the pistil, and after the pollen has been shed it bends back again. The powerful fetid odour and acrid taste of this plant depends on the presence of a volatile oil."

This interesting account of the fecundation of rue should impel the inquirer to look into this matter.

Relating to the virtues of the order, we may well quote the following from the 'Vegetable Kingdom:'

"The species are characterised by their powerful odour and their bitterness; they act principally on the nerves. Common rue and another species are said to be emmenagogue, anthelmintic, and sudorific. *Ruta montana*, a Spanish plant, is so acrid that it blisters the hands of those who gather it through three pairs of gloves, and produces erysipelas and ulcerous pustules when applied to the naked hand.

Egyptian women bruise the leaves of *Haplophyllum tuberculatum* in water, and wash their hair in it in order to make it grow.

The *Diosmeæ*, or Buchu plants of the Cape, are well known for their powerful and usually offensive odour. Several, especially *Barosma crenata*, are recommended as antispasmodics and diuretics.

The American species possess, in many cases, febrifugal properties.

There is an excellent bark used by the Catalan Capuchin friars of the missions on the river Corony, in South America, called the quina de la Guayna, or de la angostura, or angostura bark, which is said to be the produce of *Gallipea cusparia* (*Bonplandia bifoliata*, W.), a plant of this family. Dr. Hancock, however, thinks that it is a distinct species, which he calls *Calipea officinalis*.

He says that he is fully convinced, from ample experience, of the virtues of this bark, that it is one of the most valuable febrifuges we possess, being adapted to the worst and most malignant bilious fevers, while the fevers in which cinchona is chiefly administered are simple intermittents, for the most part unattended with danger.

Both the Buchu and Angostura were formerly much used in medical practice, but they now can rarely be found in the list of apothecaries' simples. The angostura bark makes a fine bitter, and its tincture added to spirits or sherry is highly grateful as a "pick-me-up" to those who, from long residence

in warm climates or over-indulgence, find it necessary to stimulate the digestive organs into action.

3. *The Quassiads* are well represented by the wood of a fine tree, native of Jamaica, which is obtained from the *Picræna* (*quassia*) *excelsa*, as also from the *Quassia excelsa*, two species often confounded.

The quassia wood (lignum quassia) of the 'Pharmacopœia' is intensely bitter. It was at one time very abundant and cheap, on which account it was probably too much employed in the adulteration of beer; but, being now much scarcer, and the duty removed from hops, we will hope that it is not now used in this way to any great extent.

Quassia is said to exert a very powerful effect upon some of the inferior animals, and yet, strange to say, the 'Veterinary Pharmacopœia' makes no mention of it, nor do we know of any series of experiments having been made by any veterinary practitioner of this country; still, we cannot help quoting the following upon this matter from Pereira's 'Materia Medica:'

"Posological effects *a. On Animals.*—From recent experiments it appears that quassia wood acts on animals as a narcotic poison. Dr. Wright tells us that no insect will live near cabinet work made of it. It has been long known that an aqueous infusion of this substance was an excellent fly poison; but Hartl, one of Buchner's pupils, has lately shown that it also possesses poisonous properties with respect to the larger animals. Thus he found that a rabbit, into a wound of whose thigh a grain of alcoholic extract of quassia had been introduced, lost his strength and liveliness, and died on the third day. A second experiment, made on an older and stronger animal, was attended with the same results. No pain appeared to be experienced, nor were there any marks of irritation or inflammation observable after death.

"Kurtz mentions that complete paralysis of the hind extremities of a dog affected with the mange (*Fettrände*) was brought on by washing the ulcers with decoction of quassia; in seven hours, however, it disappeared.

"β. *On Man.*—In the usual medicinal doses quassia operates as a stomachic and tonic; that is, it is bitter to the taste, promotes the appetite and assists digestion. It is devoid of all irritant, stimulant, and astringent qualities, and has been, therefore, taken as a type of the simple and pure bitters."

All authorities combine in this report of the action of quassia on man; it is, therefore, not a little interesting that its effects should be so different upon the lower animals, but this very circumstance seems to point out to us how important

it is that this wide field of inquiry should be explored by the veterinary practitioner quite independently; but, in as far as we know, he seems to take many of his ideas of the effects of vegetable medicines at least from the human school, which latter, it is true, has experimented largely upon the action of medicines, and with very great advantage; so much so, indeed, that we cannot help thinking that much good may be done in the direction we have indicated.

THE JURIES' BILL.

Remarks by Mr. M. J. Harpley, V.S., Royal Horse Guards.

Mr. Lopes, the member for Frome, has prepared and brought into the House of Commons a bill by which he proposes to amend and consolidate the law relating to juries; among the exceptions in clause 5, I find that members of the Royal College of Veterinary Surgeons actually in practice are included.

That we have not been forgotten by the promoters of the present bill must be a source of congratulation to the profession, as it proves that the efforts we made last year have been most successful.

The Attorney-General, who had charge of the bill of last session, admitted that we had a strong case, although he refused to entertain our claims, his object being to abolish, rather than to create, freedom from service. But when Colonel Barttelot's amendment came on for discussion, the feeling of the House was so strongly in our favour that the Government gave way rather than risk a division, and the long-wished for immunity was virtually conceded.

It now only remains for us to watch the progress of the bill, and see that no opposition is made to the clause in which we are so much interested.

ON THE TREATMENT OF CAPPED ELBOW.

By R. Spooner Hart, M.R.C.V.S., Calcutta.

I boldly assert that no treatment is so successful for the reduction of the enlargement designated capped elbow as the one I employ, which consists in removing the cause

and producing local excitation of the part by friction with some oleaginous preparation or soap liniment, favouring thereby the free play of the hand, and innervating and stimulating the vascular activity of the part. This opinion is founded upon extensive practice in the treatment of capped elbow, and I predict with some confidence the future publication of confirmatory evidence from other practitioners. Of course, friction is contra-indicated when there exists severe inflammatory action and lameness. Many cases of capped elbow come on quite suddenly, the subject appearing quite well overnight, and by the next morning you may find him exceedingly lame from an attack of cellulitis over the point of the elbow. The inflammatory action appears to involve the skin, and the whole of the tissues surrounding the part, giving rise to a diffused painful swelling, which is greatest over the point of the elbow, dying gradually away towards the edges. Inflammatory action may be recognised by the shape of the swelling, the presence of heat, pain, and lameness, and by the animal showing a disinclination to have the part handled. Here hot fomentations perseveringly applied have the happiest effect, combined with other antiphlogistic measures. If you suspect effusion and the presence of a quantity of fluid you should not hesitate to make a depending orifice into the enlargement; but this is not always necessary, as the swelling will frequently become quite reduced, and the effusion will become absorbed if the hot fomentations are continued. Such cases frequently and quickly do well under this treatment; but occasionally an extension of the inflammatory action down the arm with swelling of the knee and parts below it takes place, which doubtless is in part favoured by gravity. On the subsidence of the acute inflammatory action the swelling of the latter may quickly pass away, but the knee may remain puffy and swollen in the front for some time, and require treating. Diuretics, aperients, hot fomentations, and, in the absence of inflammatory action, mild stimulating liniments, with friction, bandaging, walking exercise, &c., is the treatment indicated.

With a pendulous enlargement of the elbow, containing a quantity of indurated matter, and perhaps a quantity of serous fluid, it will be found occasionally advantageous to freely lance the part, as thereby frequently a large mass of yellow semi-solid fibrinous matter is given exit to. Having done this, I endeavour to heal the part rapidly by applying daily carbolized oil and cold water, the latter played on the part by the aid of a hose. This treatment, in the course of a

week or so, will be followed by a further reduction in the size of the enlargement, and the closing up of the incision by a quantity of newly-formed granulations. To these newly-formed granulations and thickening surrounding the interior of the incision apply sulphuric acid paste once, twice, or oftener, as the case may be, and induce the eschar to separate quickly by applying Unguentum terebinthinæ on cotton-wool. The getting rid of the newly-formed granulating material, and the hardening referred to, will reduce the quantity of solid matter which will remain to be absorbed when the part heals. I seldom or never incise one of these enlargements, for many of them appear to ensue in a comparative hard state and free from much inflammatory action, and I invariably, without delay, put them under the reducing agency friction, particularly if pendulous and of long standing. I usually prescribe a liniment consisting of equal parts of Ol. Lini and Ol. Tereb., to which I add from twelve to sixteen parts of Calvert's No. 4 or 5 Carbolic fluid, which is to be well rubbed into the capped elbow once or twice daily. A liniment of this kind and strength, when applied with friction, causes redness of the part and desquamation of the cuticle, and also a partial loss of hair. Most subjects will bear daily and continued friction with this application. It matters not how big the enlargement on the elbow may be; if the brisk rubbing is perseveringly kept up you will in the course of a fortnight or three weeks have the pleasure of seeing it very visibly reduced and almost gone. Blistering, setoning, iodine, and escharotics are all superseded by the rapidly reducing agency of friction. As an adjunct, attention to the shoes and to the future shoeing is necessary; one or both heels of the shoe must be cut or rasped smooth or the shoe removed entirely. The patient should also be tied to the pillar reins for a few days, or the foot covered with a pad. Capped elbow is not a common occurrence in unshod horses, and cases will occur with one elbow capped after the other. The reason is obvious.

The reduction of the capped elbow by means of friction with stimulating liniments possesses many advantages over the other modes of treatment which are had recourse to for this purpose. Those which occur to me are as follows—that from the first the friction causes a visible reduction in the enlargement, and this improvement continues unchecked. The treatment is free from pain, leaves no blemish, the subject continues in work with advantage, if only ordinary care be taken. Friction not only reduces the enlargement, but also the loose bag of skin in which it is enveloped. Practice

proves it to be the quickest, easiest, cheapest, and simplest method for getting rid of these unsightly enlargements.

SUCCESSFUL TREATMENT OF A SEVERE CASE OF RHEUMATISM IN THE HORSE.

By Henry Jarvis, M.R.C.V.S., Burwash, Hawkhurst.

The subject of the disease was an Irish-bred mare, four years old, which was sent from Ireland to Mr. Sherrard, Surgeon, at Hurstgreen, about the middle of May last. The mare was then unbroken and in good health. She was broken to saddle by her owner and at times ridden very fast, and I have since heard that she often came home very hot and covered with perspiration, when the groom would throw a bucketful of cold water over her and leave her to dry. On the 11th of June the owner was riding the mare rather fast from Hurstgreen to Robertsbridge, a distance of about from two to three miles, when all on a sudden she showed symptoms of lameness in the near hind leg. A veterinary practitioner, I hear, gave his opinion that she was suffering from some injury to the hip-joint, and directed that a stimulating embrocation be well rubbed into the part. On the following day the mare was worse and I was sent for. When I saw the animal she was stiff in all her limbs, and very lame of the near hind leg; she showed symptoms of pain in her back, and on passing the hand up the rectum she evinced pain upon pressure to the psoas muscles. I could detect no swelling or anything to direct my attention to the seat of lameness; but judging from the previous history of the animal I concluded that the disease was rheumatism. I administered a mild dose of Aloes Barb. and stimulated the spine with Lin. Saponis; ordered her warm bran mashes and scalded oats.

June 13th.—Medicine operating slightly; walked her out of the stable on the road; the lameness was less marked in the hind extremities, but had shown itself in the off fore-limb. Great tenderness was evinced upon pressure to the flexor muscles of the arm, which were very rigid and in a cramped state. I rubbed into the skin over these muscles Lin. Saponis. et Lin. Camph. Co. p. e., and administered night and morning Liq. Arsenicalis ʒij, Tr. Gent. Co. ʒss, et Liq. Potassæ ʒj.

15th.—The lameness had entirely disappeared from the near hind-leg and was now confined to the near fore-leg. The mare could not put any weight upon it; she frequently pawed with the affected leg, and when quiet would rest the foot upon the toe. The flexor muscles were contracted to such an extent as to render it a matter of impossibility to straighten the foot upon the leg.

The treatment was continued up to the 21st of June, but the mare getting no better, her owner began to show signs of dissatisfaction. Three non-qualified practitioners met and decided that the mare was suffering from dislocation of the shoulder-joint. I adhered to my opinion, which was, confirmed by Professor Pritchard, who saw the animal on June 24th. On the next day she was taken to our infirmary at Burwash, a distance of about four miles. A *lever shoe* was placed upon the foot to bring the leg into its proper place, but this did not seem to have the desired effect for some time, as the animal would still rest her leg upon the toe of the shoe; a blister was applied to the shoulder and arm, and Pot. Bicarb. ℥ss administered daily.

Early in July the mare began to stand better upon the affected limb, and from this time she gradually continued to improve. By the 21st of July she was able to walk tolerably well, and was therefore turned out for a few hours in the day. She has since been turned to grass with other horses in a very large field and allowed to go into a lodge at night and have corn. The muscles of the shoulder, which were very much atrophied, have now (February) assumed their usual form, and the mare is as strong as ever. She has been ridden hard, and stands it well—in fact, she may be considered quite sound.

CANCEROUS DEPOSIT IN THE EYE OF A HORSE.

By H. J. Mulvey, M.R.C.V.S., Barnard Castle, Bishop Auckland, Durham.

I have forwarded for examination a specimen of the eye, with tumour attached, which was taken from a brown carriage horse, twelve years old, the property of His Grace the Duke of Cleveland, Raby Castle. I am induced to send

you the following particulars of the case, believing as I do that it is somewhat exceptional, and may therefore be interesting. My attention was first called to this horse by the coachman, in the early part of last year, at which time the eye was protruded slightly beyond the socket, and I then gave it as my opinion that there was either abscess or tumour forming beneath the eyeball, and that it was the result of some injury. On inquiry I found that the horse had received a blow when in London the preceding season. I applied some sedative lotion, and the horse was kept at easy work, but no other treatment was then adopted. I saw him from time to time on my visits to other of the horses belonging to his grace, and noticed that the tumour was gradually getting larger. On the 24th of March last I was requested by W. T. Scarth, Esq., J.P., agent for his grace, to make an examination, and give my opinion as to whether anything could be done to render the horse serviceable. I then found that the tumour had very much increased in size, and was protruding at least an inch and a half beyond the lids, and was about four or five inches in circumference, the eye itself being forced upwards (the sight of which had been for some time entirely gone) and hidden beneath the lids, which were distended to their utmost extent; and from the irritation and consequent pain and annoyance to the horse, he was continually rubbing the tumour, which had a raw and abraded appearance. I considered that the only treatment likely to be effectual was to remove both the eye and the tumour, and by allowing the lids to close, render the animal more sightly, and remove at once the source of pain and irritation. Of the opinion I had formed I told Mr. Scarth, who at once said he would leave the animal in my hands to do what was best. I prepared the horse by taking off the corn and administering a couple of doses of laxative medicine; and on the 6th of this month (April), having cast the horse in the usual way, I administered chloroform, and having got him thoroughly under its influence, proceeded, with the aid of my assistant, Mr. Nisbet, M.R.C.V.S., to operate. I first of all made an incision through the eyelid, cut through the conjunctiva, dissected out the tumour, which was closely adhering to the areolar tissue, divided the muscles of the eye, and having secured the artery, and dressed the wound with solution of Acid. Carbol., placed a bandage over the lids, and fastened by means of a hood. The horse was allowed to rise, and was placed in a darkened stable. On Wednesday the bandages were removed, and the wound then presented a favorable appearance: it is now granulating nicely, and the horse is feeding

and doing well, and there is every appearance of his making a rapid recovery.

Remarks by Assistant Professor Axe.

The tumour above referred to was surrounded by the muscles of the eye. It was conical in form, and appeared to be a pretty correct model of the interior of the orbit from which it had been removed. It measured eleven and a half inches in its largest circumference, and five inches in length; and together with the eye it weighed thirteen ounces. Externally it was irregularly lobulated, and embraced the posterior third of the globe, and the extra cranial portion of the optic nerve. On section, it was found to be of soft consistence, and in parts more or less friable. Its cut surface exhibited a reddish-grey colour, with here and there vascular patches and hæmorrhagic spots of various forms and sizes. The diseased mass involved a considerable portion of the sclerotic tunic, and through it passed into the posterior chamber of the eye, two thirds of which it filled. The vitreous humour was much reduced in size, opaque, and of a light straw colour. The crystalline lens was also more or less opaque, and presented several circumscribed masses of calcareous deposit. Microscopically examined, the deposit was found to consist of a delicate fibrous stroma through which were dispersed cells of various forms and sizes, some of which had undergone fatty degeneration; besides these cells there were large numbers of free nuclei. The tumour evidently belonged to the encephaloid variety of cancer. Similar growths are commonly met with in the eyes of horses and others of our domesticated animals.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of March, 1874, have been found to be affected with any Contagious or Infectious

Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Calais . .	London .	Sheep-Scab	...	45	...	...	45	45
Hamburg .	„	Pleuro-Pneumonia	1	...	...	...	1	1
Oporto . .	„	Foot-and-Mouth	359	...	...	...	359	359
Total			360	45	...	...	405	405

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 13th April, 1874."

CATTLE PLAGUE.

In Roumania this disease was prevalent during the month of January. Of 150 animals attacked, 79 died, 21 were slaughtered, and 49 were stated to have recovered.

Cattle plague has again been introduced into Hungary, in the district of Tapa, and it is said to be confined to that part of the kingdom.

Fresh outbreaks have occurred in Galicia, Buckowina, and Dalmatia, and the disease continues in Croatia, Slavonia, and the military frontier.

Cattle plague is much diminished in Salonica, but continues in the island of Noxas.

Reports from Jerusalem state that the disease has broken out in the district, and is said to have carried off no less than 8000 animals.

The Italian Government have stopped the importation of fresh hides from the Syrian Coast and Palestine, on the official information that cattle plague exists there.

FOOT-AND-MOUTH DISEASE.

This disease continues in a virulent form around Lisbon; no less than 227 diseased animals from that port were landed recently at Deptford in one cargo.

The disease also exists in France, and seems to have again become prevalent in Germany, having during the last six months declined. In this country foot-and-mouth disease is gradually spreading. It is also reported to have appeared in Ireland, near Limerick.

PLEURO-PNEUMONIA.

The state of prevalence of this disease during the month of January this year in the Netherlands does not contrast favorably with its condition in the same month in 1873, but compared with the years 1871 and 1872, the decline of the disease is very marked. In England no particular effect seems yet to have been produced by the adoption of the system of compulsory slaughter.

GLANDERS.

There are evidences far too numerous to be doubted that glanders is prevailing to an unusual extent in many of the rural districts, as well as in the great towns of the kingdom, despite the legislative measures which are in force to keep it in check. The *South Durham Herald* of March 28th alludes to the sad fact that a miner at the Castle Eden Colliery had died from blood-poisoning consequent on the introduction of the virus of glanders into his system. The extract which we make relating to this melancholy occurrence says that—

"Many horses in the district of Castle Eden have been visited by a contagious disease called glanders. At Haswell several have been shot, and numerous animals are still suffering. At Castle Eden Colliery five horses were shot about a fortnight since, and several were brought out of the mine to prevent further spreading of the disease.

"A miner named Joseph Hull washed his hands in a trough out of which a pony suffering from the disease had drunk. Hull at the time had an open wound on his right hand. The day following his hand was much swollen. The

swelling gradually increased, and in a short time his whole body was a mass of corruption. He died on Wednesday morning, Dr. Wilson, who had attended him, giving a certificate that the deceased died from blood-poisoning caused by inoculation from a glandered horse. The deceased was twenty-four years of age, and had only been recently married."

The *Newcastle Daily Journal* also calls attention to the prevalence of the disease in the same district, and adds that—

"On Saturday, March 28th, at the Castle Eden police court, before the Rev. W. Mayor and Capt. Nott, R.N., George Liddle, of Shotton Colliery, was charged by Sergeant Cessford, under the Contagious Diseases Animals Act, with driving a horse, on the 13th inst., upon the highway, knowing it to be suffering from glanders.

"The case was proved, and the defendant was fined £4 15*s.*, including costs.

"William Paley, a horse-dealer, residing in Sunderland, was charged with a like offence, at Shotton Colliery, on the 14th inst. Sergeant Cessford informed the magistrates that the defendant bought the horse above referred to, and, regardless of an order made by the magistrates for the destruction of the horse, he broke into a stable where it was confined by the police, and removed it to Sunderland. The defendant pleaded guilty to the charge, and was fined £5 1*s.* 8*d.*, including costs.

"Sergeant Cessford afterwards made an application for the destruction of two horses belonging to a carrier named George Lister, of Haswell Moor. After proof had been given the application was granted.

"The disease is spreading with alarming rapidity, and fears are entertained that the authorities will have to resort to stringent measures to stamp it out."

TRICHINOSIS.

The German periodicals (says the *British Medical Journal*) report several cases of trichinosis. In Hasselbusch, early in March, a lady, her servant, and eight other persons were infected by eating a small quantity of raw pork. Several children also, in Rapendorf, are said to have been attacked with trichinosis, in consequence of ths use of some sausages given them by their companions in Hasselbusch. In Lisa, five persons in a merchant's house have been attacked by trichi-

nosis. They had partaken of a ham which, according to all accounts, was well pickled and smoked, and boiled for two hours. From further inquiries it has been ascertained that the remainder of the ham was full of trichinæ. Its vendor is ill from the same cause.

Facts and Observations.

Fatal Epidemic amongst Ponies.—Dr. Cobbold has just received from Mr. Rees Lloyd, of Dowlais, an important communication, and also some preparations for investigation having reference to an outbreak of parasitic disease amongst Welsh Mountain Ponies. Two species of parasites appear to be concerned in the production of this epizootic, namely *Tænia perfoliata* and *Strongylus tetracanthus*, the latter being the principal cause of the mortality, which already exceeds one hundred animals. We hope to give details in the next number of this Journal.

Trichinosis.—The *Berliner Klinische Wochenschrift* of February 9th says that cases of trichinous disease lately occurred in one of the districts of the city; but it was hoped that measures would be at once adopted with sufficient energy to prevent the spread of the disease. A number of cases were reported also from Potsdam. The occurrence of this disease, our contemporary says, gives an unfavorable idea of the condition of sanitary matters in Prussia; there is scarcely any disease of which the etiology is better understood, or which can be more certainly avoided than trichnosis. —*London Medical Record.*

The Thursley Poisoning Case.—At the adjourned inquest on the bodies of Thomas and Charlotte Coombes and their three children, held at the Half Moon Inn, Thursley, Dr. Stevenson, of Guy's Hospital, deposed that he had found arsenic in the viscera of the five bodies. The coroner having summed up, the jury returned a verdict of "Death from accidental poisoning," accompanied by an expression of opinion in favour of compelling manufacturers of sheep-dressing liquids to paint the word "Poison" on the tubs containing the composition. We hope this sad case will act as a warning to farmers throughout the kingdom.—*Lancet.*

Rabies and Hydrophobia.—Two fatal cases of hydrophobia are reported in the *Sheffield Daily Telegraph*, both

occasioned by bites from a cat. The one case, that of a female domestic servant, aged thirty-two years, occurred in this wise. While engaged in toasting some bread on Christmas day the cat attacked her, fastening upon the left hand, and the animal was dislodged with difficulty. The day following Christmas day the same cat attacked a man, wounding him, and he died of hydrophobia on the 22nd of January. The young woman first bit did not manifest symptoms of hydrophobia until the 29th of March, and she died on the 31st.

It is also reported that rabies has recently appeared among Earl Fitzwilliam's pack of hounds, and that it has been necessary to destroy many of them.

The occurrence of cases of hydrophobia in different parts of the kingdom, according to the reports of local papers, should enlist the attention of medical officers of health. It would seem as if rabies were becoming more prevalent among domestic animals than usual, and it is well that local authorities and their officers should be on the alert to give warning of suspicious cases, and to take necessary measures of precaution against the inoculation of the horrible malady. With respect to such cases and to the needful precautions, we would direct especial attention to Mr. George Fleming's valuable treatise "On Rabies and Hydrophobia: their history, nature, causes, symptoms, and prevention" (Chapman and Hall). This important work has filled up a great hiatus in English medical literature on the subject, and it should be consulted by all who desire to acquire a competent knowledge of rabies. The chapters on the symptoms of the disease as observed in domestic animals, and on its prevention, are exhaustive.—*Lancet.*

Formation of Lymph.—Paschutin has recently made some experiments on the brachial lymphatic trunk of the dog in the Physiological Institute at Leipsic. The rapidity of the discharge of the lymph was always greatest at the commencement of the experiment, and gradually diminished subsequently. Active movements caused considerable increase in the quantity formed. Section of the spinal cord and brachial plexus, followed by the administration of woorara, caused increase for forty or fifty minutes, but the quantity then again fell. He satisfied himself that variations in the blood-pressure had little or nothing to do with the quantity discharged. The amount of albumen in the lymph varied from 2.61 to 6.55 per cent. The proportion of albumen increases with the diminution of the absolute quantity of lymph excreted, and diminishes with its increase.

THE VETERINARIAN, MAY 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

"HARMLESS MAD DOGS."

UNDER the above heading the *Globe* of April 21st contained the following criticism on M. Bourrel's treatise on 'Canine Madness:'

"The dread of hydrophobia seems to be as strong at present in France as in this country, perhaps even stronger, for we do not remember to have seen any proposition to adopt extreme measures like those which have just been suggested to the French Academy of Sciences. A Parisian veterinary surgeon, named Bourrel, has published a treatise with the following taking title: 'Traité complet de la rage chez le chien et chez le chat; moyen de s'en preserver," in which he proposes to cut off and file down to a flat surface the front teeth and canines of our domestic carnivores. This would undoubtedly be an effectual method, but M. Bourrel fears that a sneaking, sentimental feeling, arising out of the affection which people often inconsiderately entertain for their own dogs, may stand in the way of the general application of this remedy. It must be confessed, however, that M. Bourrel deserves to succeed. Not content with founding his preservative method upon purely theoretical considerations, he had the courage to make some experiments, from which most persons would shrink. He actually operated upon the teeth of these rabid dogs, and afterwards allowed one of them to bite his gloved hand. When their teeth were filed down the dogs could no longer wound other dogs upon which they were let loose, although they bit them viciously, and from further experiments it appeared that even the naked human skin might be proof against the attacks of animals so mutilated."

We have repeatedly alluded to the utter absence of anything like effectual means for the protection of the public against the attacks of rabid dogs, the number of which increases in exact proportion to the laxity of the measures which are employed, or rather suggested, for their repression;

but we confess that so radical a method of limiting the extension of the disease as that which M. Bourrel recommends never occurred to us, and yet it is not very far-fetched. We hear of the extraction of the fangs of poisonous snakes, creatures which, compared with rabid dogs, are playful companions. For less serious reasons—indeed, for no reason at all—dogs have to undergo "cropping" and amputation of the tail, to say nothing of "worming" and removal of the dew-claws. Why, then, should we hesitate, by a perfectly safe operation, to render the animal harmless, whether sane or mad, without in the least interfering with its beauty? Excision of the incisors and canines would not be a serious matter, save in the case of hounds, which might be exempted from the operation, and in return for the sacrifice of the feeling of "sneaking sentimentality" we should have the satisfaction of knowing that the most horrible disease to which human beings are liable would soon cease to exist.

If M. Bourrel succeeds in establishing the system which he advocates in France we shall indulge a devout hope that, like other French fashions, it may quickly become popular in this country.

INSPECTION AT THE PORTS.

We are informed that there will shortly be two vacancies in the list of inspectors in the Veterinary Department of the Privy Council — one in the port of London and one in Liverpool.

The salaries are at present £200 and £250 per annum respectively.

1. The candidate must be a member of the Royal College of Veterinary Surgeons.

2. Each candidate will be required to pass an examination in the following subjects:

a. Veterinary science, and more especially in reference to the contagious and infectious diseases of animals.

b. The laws in operation as regards these diseases.

c. English composition.

This examination will take place at the Royal Veterinary College, and will be conducted by the Principal of the College, the Chief Inspector of the Veterinary Department, and such other examiner or examiners as may be nominated by them.

PARASITISM IN AUSTRALIA.

In several previous numbers of the *Veterinarian* we have taken occasion to refer to the great interest which the subject of entozoa excites in Australia. Yearly, at home, fresh evidence is being afforded of the destructiveness of internal parasites amongst the lower animals; these outbreaks being by no means confined to cattle. At the present time, epidemics of Trichina affecting the human subject are occurring in Germany, and we have just heard, on good authority, that a considerable outbreak of Trichiniasis now exists in England. Moreover, evidence is immediately forthcoming of the occurrence of a fatal entozootic amongst our Welsh mountain ponies. In the meantime, as bearing upon the general question of parasitism, we have much pleasure in quoting the following article from the Melbourne *Leader* of 31st of January. Referring to the small work on the internal parasites of our domesticated animals which is used as a class *manual* at the Royal Veterinary College, the writer says:—

Professor Cobbold has given to the world another proof of his special devotion to the study of the history and development of internal parasites. In the manual he has recently published he fully demonstrates that the study of internal parasites is at once interesting and unpleasant—interesting because of the many curious facts connected with the life history of such parasites, and unpleasant because we may at a glance understand in what way we are liable to become infested with such horrible creatures—by drinking at water-holes, by eating fallen fruit or salads, or by partaking of under-cooked meat. In our somewhat thirsty climate, probably some hundreds of people, scattered over the interior, drink daily from tanks or pools of surface water, yet in so doing they may swallow the ova of flukes or of tape-worms.

If the eggs of the former, they may find their way into the ducts of the liver; if the eggs of the latter, they may obtain an entrance into the blood-vessels, and at last find a lodgment on the brain or in any other part of the body, constituting what are popularly called hydatids. The scientific study of internal parasites is one of great importance in this colony, for, as is shown by our statistics, hydatid disease is greatly on the increase in the human subject. The following table shows the number of deaths from hydatids in Victoria for the eleven years ending 1872 :—

Years.	Males.	Females.	Total.
1862	3	2	5
1863	3	2	5
1864	6	3	9
1865	9	6	15
1866	18	7	25
1867	13	12	25
1868	21	12	33
1869	12	10	22
1870	10	7	17
1871	6	9	15
1872	24	5	29
Total in eleven years .	125	75	200

This mortality gives only a faint notion of the extreme prevalence of hydatids in Victoria, since numbers of cases are cured by tapping, and otherwise by medical treatment, or by spontaneous bursting of the cysts; and also, since hydatids are often found on post-mortem inspections after death, from other diseases. To meet with hydatids as a cause of deranged health of the various great viscera of the human body is now a matter of daily expectation with every medical practitioner. Unless more care and caution are exercised by our population, there is every reason to believe that parasitic disease will greatly increase. Hence it is extremely desirable that every one should acquire a general knowledge of the mode in which internal parasites are propagated. The reader will find Professor Cobbold's book written in such a popular style that he can have no difficulty in understanding it. The majority of readers will, probably, regard such a subject with the same sort of aversion as they look upon a dose of medicine, but all those who really consult their own physical welfare should read attentively such a book as this. Every stock-owner should procure a copy. The author refers to the internal

parasites which infest the lower animals as well as man, and explains by what curious migrations of the parasites they shift their quarters from man to beast and from beast to man.

By the careful reading of this book stock-owners will learn what it is which makes so many of their young sheep affected with "sturdy," or "cranky," to use the colonial word. The annual loss of young sheep through becoming "cranky" is considerable, yet on many if not all of the sheep stations the disease is actually propagated unwittingly. When a cranky sheep is put out of its misery its head is divided and thrown to the station dogs in an uncooked state. Thus the hydatid on the sheep's brain becomes a tape-worm in a dog, and in a very short period millions of tape-worm eggs pass from the dog, and are drifted about by the wind, and are carried by water. For weeks and months they retain their vitality, unaffected by heat or cold, rain or drought. Sheep in picking up their food, or in drinking water out of shallow pools or crab-holes, swallow one or more of these eggs, which in due course get into the blood circulation and thus to the brain to form a hydatid and make another sheep cranky. Thus the sheep and the dog react upon one another.

It has not unfrequently been the practice of scientific observers, when they meet with any creature for the existence of which they cannot account, to give it a convenient name, and ascribe its origin to spontaneous generation. In mechanical science the now well-known action of the common pump was accounted for by the sapient dictum that nature abhors a vacuum, and in the science of heat we have to this day the well-known phrase "latent heat" to express something which is not as yet accounted for or understood. Again many scientific men, when they have tried such shifts as are here referred to, and find them unsuitable, venture upon expressing a hypothesis, and forthwith the thoughtless world accepts the latter as a scientific truth. Our author, however, is not a philosopher of this stamp. Whatever he finds he tries to account for by patient study and research. He evidently has no belief in the theory of spontaneous generation. Whatever exists must be examined, and its cause, if possible, discovered. Spontaneous generation is a very convenient phrase to give expression to our ignorance. If a pseudo-philosopher finds within the cranium of a sheep a large hydatid cyst pressing upon the brain, and thus rendering it "cranky," he will be ready to say when he sees the living objects within their watery envelope, "Ah, here is a case of spon-

taneous generation, for where is any doorway in the bony walls of such a house by which an entrance can have been effected?" but the true observer traces effect to cause, and at last learns that some of the eggs of a tape-worm voided in millions by dogs have been swallowed by sheep, got into the blood, and lodged in the brain, till the house and its tenants perish together, or, perhaps, by the chance swallowing of the tenant by another dog, it is developed into a perfect tape-worm producing in its turn millions of eggs to be swallowed by other sheep, and perhaps by human beings, spreading misery and death. Professor Cobbold states that the fact has been clearly established that all forms and varieties of the common hydatid are merely the larval stages of growth of a minute tape-worm which resides in the dog (*Tænia echinococcus*). Another tape-worm (*Tænia mediocanellata*), which to an alarming extent infests the human subject in some parts of India, migrates between men and cattle. He gives a representation of one of these tape-worms about thirteen feet in length and having about twelve hundred joints or segments. Each segment, he states, is capable of producing thirty thousand eggs, or a total of thirty-six millions. By reason of the unclean habits of the natives of India such eggs are swallowed by cattle with their food or drink. The young brood immediately burrow into the muscles of the cattle and there remain in an undeveloped state, waiting, like Micawber, "for something to turn up." Thus, when cattle are slaughtered and the meat is eaten in an under-cooked state by men, these horrid creatures arrive at their perfectly developed condition.

Up to the present time we in Australia know little of the dangers our population are exposed to from internal parasites. We know, as we have already remarked, that hydatids in the human subject are yearly increasing. We happen to know also that amongst our live stock diseases have been discovered, and nothing said about them. A few years ago a number of sheep which had been for some time kept on wet marshy land in the Western Port neighbourhood were purchased and sent to paddocks near Kilmore. The owner noticed that they did not thrive, but began to fall away in condition. Some died and others had a husky cough. Some of the latter were killed, and on examination it was discovered that in the bronchial tubes there were vast numbers of small thread-like worms. There is no doubt that the loss of these sheep was caused by the lung strongle (*Strongylus filaria*) described by Professor Cobbold. The whole of the sheep were either destroyed or sold for slaughter, and, so far as we are aware,

nothing more has been heard of the disease. Large numbers of sheep have been recently lost in the Bathurst district of New South Wales by the presence of myriads of minute worms in the second stomach. Are these the same filaria that infest rabbits and even some of our horses in the colony, as, for example, in the thoroughbred horse Knavesmire that died of nasal disease? In the same year that these parasites were first observed in England, and formed the subject of inquiry by Professor Simonds, they were found in our Gipps Land district infesting young sheep on the low swampy land near the lakes there. A large percentage died, and in trying to drench the animals with a solution of salt and water many of them were suffocated. The owner expressed his intention of sending those left into the saltbush districts of New South Wales, where he thought they would become cured. Diseases in man and beast are often spread in this way. This is probably how we should account for the multiplication of "fluky" districts in this colony. Some years ago sheep infested with fluke could be purchased at a low figure, and under the impression that the vegetation of certain districts would cure the disease, they were removed to places where fluke had never been known before. The result was, perhaps, satisfactory to the short-sighted owners, who probably fattened their flocks and got rid of them, but, in the meantime, they blindly stocked their runs with the ova of parasites, which will probably never be got rid of.

Although in many respects the health and welfare of man and the lower animals are intimately connected with each other—perhaps to a greater extent than any one dreams of in the present day, unless it be amongst a few of the more studious members of the medical profession who have become familiar with the inter-relationship—yet it is primarily to the preservation of our own species that our attention should be directed. Now in the light of the facts disclosed in the work before us, it is manifest that the mode in which dairy cattle are kept and fed, or rather starved, on the parks and reserves around this city, is most objectionable and dangerous. These reserves are the haunts of hundreds of tape-worm infested dogs, which at every hour of the day may be seen swimming in water-pools from which the cows drink. It may thus be inferred almost with absolute certainty that such cattle swallow in their food and water myriads of tape-worm eggs, that their flesh is infested with larval tape-worms, and that the eggs may have first got into the blood circulation, and thence into the milk; thus, in the form of tape-worm or hydatids, scattering death and misery

amongst the population. It must be unsafe to use milk obtained from cows fed and watered within the public reserves around Melbourne without it is subjected to a temperature sufficient to destroy the vitality of any ova which may be in it. As dogs are the chief mediums by which hydatids are communicated to man, all food administered to dogs ought to be thoroughly cooked.

The native animals of Australia we know are much infested with internal parasites. Some of those now found in the kangaroo and the smaller marsupials may have been derived from our domestic animals, but tape-worms and many other internal parasites were met with in such animals in regions then wholly unsettled. Professor Cobbold mentions that in a batch of worms sent to him from Australia he had identified one which has been found in America, but not as yet in Europe. At the present moment we know little or nothing of Australian parasites, which may, perhaps, for anything we know, be as peculiar as the animals they inhabit. There is undoubtedly a fine field here for scientific research open to any one who will devote the necessary time and careful enlightened attention to the study of parasites. We need scarcely add that Professor Cobbold's work should be in the hands of every stock-owner in the colony.

Review.

Quid sit pulchrum, quid turpe, quid utile, quid non.—Hor.

A Manual of Botany, including the Structure, Functions, Classification, Properties, and Uses of Plants. By Robert Bentley, M.R.C.S., F.L.S., Examiner in Botany to the Royal College of Veterinary Surgeons, &c. London: J. & A. Churchill; Third Edition, 1874.

Few branches of science are more attractive than botany, and certainly no one of them is so well represented in this country by efficient manuals and guides for the class-room and the field as that which Professor Bentley has undertaken to illustrate. From the veterinarian's point of view we can readily understand that such an exhaustive manual as the one before us may at first sight appear to be rather calculated to frighten the student than to attract him. The student

approves the wisdom of those who have alleged that some knowledge of plants is necessary for the veterinary practitioner, but he is not unnaturally alarmed at the idea of being asked to wade through the contents of 700 closely printed pages, comprising thousands of technical terms. In truth, however, so far as the teaching of botany at the Royal Veterinary College is concerned, the student is asked to do nothing of the kind.

Professor Bentley's manual contains an immense amount of valuable information, and is a perfect marvel of literary condensation. With one notable exception, and that does not concern the veterinarian, we have all the large and various departments of botanical science well represented, and the details of them are reduced within limits which, notwithstanding the bulk of the volume, are extremely narrow, considering the immense range of the subject as a whole. The amount of labour bestowed upon the work must have been very great, the author evidently intending to make the little treatise as perfect and comprehensive as possible. It is pleasing also to observe that, unlike certain other manual writers, he has succeeded in doing all this without mutilating or destroying the beauty of our mother tongue. The language is clear and precise throughout.

Of course, no one understands better than Professor Bentley does, that the student of veterinary medicine is chiefly concerned in familiarising himself with the names and characters of those wild plants which too often prove injurious to our domesticated animals. The student should not only know that hemlock, hellebore, aconite, and scores of other indigenous plants are poisonous when ingested along with fodder, but he should be able (when appealed to by agriculturists and other interested persons) to recognise these plants in the living state. Further than this, he should be able to state what species growing in the fields are comparatively harmless; and when suspicious plants are handed to him, whether in the dry or recently gathered state, he should be able at once to satisfy the minds of those who solicit his professional assistance. Field botany is, therefore, essential to the student, but it is useless to expect him to attain anything like proficiency in this practical science unless he has previously acquired some knowledge of the "organisation and external configuration of plants, and of their various parts." In this important division of the subject Professor Bentley's manual is a most excellent guide, both for the class-room and the closet; but, for field purposes, we know of no volume so suitable, accurate, and

concise as Mr. Bentham's 'Handbook of the British Flora.' To be sure, as leading up to Professor Bentley's manual, we have been in the habit of recommending the very lucid little introduction by Professor Oliver, entitled 'Lessons in Elementary Botany,' but whilst we shall still continue to employ the latter as a handy class-book, we shall equally recommend the more imposing manual now before us, feeling certain that in after life, as well as during the state of pupilage, the student will find Professor Bentley's work an invaluable book of reference. Especially will he find it serviceable in acquiring a knowledge of the properties and uses of plants; all the more important species, either used in medicine or employed as food, being particularised under their appropriate natural orders. Of the value of this not inconsiderable section of the work he may readily satisfy himself by reading what is said, for example, of the genera *Linum*, *Amygdalus*, *Nicotiana*, and *Strychnos* respectively.

A more satisfactory and concise record of the properties and uses of the plants contained in these genera could not be found in any manual specially devoted to *materia medica*.

It is almost superfluous to add that this *third* edition is amply illustrated by appropriate and beautifully executed woodcuts. What few errors the former editions contained appear to have been corrected, and several new drawings have been supplied. In particular, we observe that a formerly misplaced block, having reference to the position of the ovule, has been put in its proper position; and, in short, no pains have been spared, either by the author or publisher, to render this the best class manual of botany in the English language.

Extracts from British and Foreign Journals.

FARMERS' CLUB.

MILK: ITS SUPPLY AND ADULTERATION.

A Lecture by Dr. A. Voelcker.

(*Continued from p.* 246.)

If the object of the dairy farmer is to produce milk for the town, it will not pay him to keep grazing dairy stock on growing

grass, and he will find it to his advantage to feed the cows in house upon cut grass, supplemented by oilcake, meal, brewers' grains, and similar purchased food. As a matter of economy milk can be produced as economically in or close to large towns as in the country; for any extra expense to which a town dairy-farmer may be put is made good by the expense of carriage to the nearest railway station, and the railway charges. The advocates for the town produce of milk maintain that in warm weather a good deal of milk is spoiled during its transmission by railway. However, by observing the following simple rules, country milk may be sent by rail on long journeys without spoiling even in very hot weather. 1. The milk should be drawn from the cow in the most cleanly manner, and strained through wire-cloth strainers. 2. The milk should be thoroughly cooled immediately after it is drawn from the cow. This may be done by a milk-cooling apparatus, specially constructed for rapidly cooling milk, or simply by placing the can in which it is contained in a vat of cold water, deep enough to come up to the height of the milk in the can containing it, and by using at least three times as much cold water as the milk to be cooled; the milk should be occasionally stirred until the animal heat is expelled. The milk should be cooled down as rapidly as possible to a temperature of about 55 degrees. The evening's and morning's milk should be cooled down separately, and be sent in separate cans, and not mixed together if it can be avoided. 4. No milk should be kept over to deliver at a subsequent time. 5. The pails and strainers employed on the farm should be thoroughly cleaned, scalded in boiling water, and dried, morning and night. 6. Immediately before the milk is placed in the cans they should be thoroughly rinsed with clean cold water, and great care be taken to keep the cans and milk free from dirt or impurities of any kind. When the cans are not in use they should be turned down on a rack with the tops off. 7. Before the cans are returned to the country they should be rinsed out with clean water, and scalded with boiling water. 8. In very warm weather it is well to put the milk cooled in cans covered over with a coarse flannel casing, which may be kept wet for a considerable time.

2.—TOWN PRODUCE.

Many persons naturally enough are prejudiced in favour of country milk; they believe that cows are healthier and better, and yield a more wholesome and richer milk in the open field than cows kept in towns, and they maintain that town-dairies are a nuisance which ought to be abated, and be all removed outside. However, town dairies need not necessarily be a nuisance, and as a matter of fact many are kept scrupulously clean, and are as well managed as the best dairies in the country. As regards the quality of milk from town-fed cows I would observe that I have had a very large experience in the examination both of country and town milk, and am bound to say that, as a rule, London milk, when undiluted,

is considerably richer in cream than country milk. I ascribe this to the fact that cow-keepers in large towns mostly are men of business, who find it profitable not to stint their cows in food, and to supply them with a better and richer description of food than that which the ordinary run of dairy farmers provide for theirs. In this respect I cordially endorse the remarks which Mr. J. C. Morton made in his lecture on London Milk, delivered in 1865, before the Society of Arts. Mr. Morton says, "Even in the midst of green fields the cow-keeper finds it the best policy for the production of good, abundant, and wholesome milk, to keep the cows in houses; and in London, where the supply of brewers' grains is so abundant, it being the constant food all the year round wherever milk is produced for direct consumption, where large markets for mangolds and for hay exist, and where grass can be supplied in abundance during summer at the cow-house for 20s. to 25s. a ton, the means of keeping cows are especially good. Here, too, we have the guarantee of the quality of milk which is afforded by a high premium in keeping cows in good condition; there is here the best market in the world for cattle of all kinds, if they are fit for the butcher, and probably as poor a market as there is anywhere for poor dry cows. Moreover, the rush of infectious disorders—necessarily greatest in the crowded cow-house—makes it especially necessary for the town cow-keeper to keep his stock in fattening condition, that they may be disposable at a moment's notice. And all these circumstances secure the best feeding being adopted here—much better feeding than satisfies the ordinary country dairyman. I have no doubt, therefore, that the milk yielded by a London cow is better than that which the same cow would produce under ordinary Gloucestershire or Cheshire management."

3—PRESERVED AND DESICCATED MILK.

When milk is evaporated at a low temperature, and a little sugar is added when the process of evaporation is nearly completed, the residue which is left on final evaporation on being reduced to powder constitutes a white powder with a yellow tinge, which dissolves for the greater part in boiling water. The solution resembles in appearance and taste milk, and answers pretty well as a substitute for milk for ship's use, or when fresh milk cannot be obtained. Desiccated milk, if well prepared and perfectly dried, may be kept in closed bottles for many months without undergoing any change, but it does not dissolve perfectly in water, and is deficient in the agreeable taste which characterises good fresh milk. Usually a portion of the cream is removed before the evaporation of the milk, for if the whole milk is condensed by slow evaporation, the desiccated milk is very apt to assume, after a short time, a bad taste resembling rancid butter. The following are analyses which I made some time ago of two samples of desiccated milk :—

	No. 1.	No. 2.
Moisture	4·06	1·78
Fat (pure butter)	8·73	16·32
Caseine	20·25	20·37
(containing nitrogen)	(3·24)	(3·26)
Phosphate of lime and magnesia	2·34	2·33
Alkaline salts	2·48	2·91
(containing phosphoric acid)	(0·26)	(0·31)
Sugar	62·14	56·29
	100·00	100·00

The second sample, it will be seen, contains nearly twice as much fat (pure butter) as the first, which was evidently produced from skim-milk. The sample No. 1 had a nice taste, and, notwithstanding the deficiency of butter, was a superior preparation in comparison with the second sample, which had a disagreeable taste of rancid butter. A much better description of concentrated milk has been prepared for a good many years past in America under Borden's patent, and a few years since an American Company—the Anglo-Swiss Condensed Milk Company—has established a factory at Cham, near Zug, in Switzerland, for the production of pure Swiss preserved milk. This company, with a capital of £12,000, employs about sixty operatives in their factory. The number of cows hired for the year is 1,440, and the average amount of condensed milk prepared daily during each of the 365 days of the year is 110 cases, of four dozen each of 1 lb. cans; these equal 1,927,200 cans as the product of the year. The price of the crude milk is about 2d. per quart; and the daily cost of the tins or cans made at this establishment amounts to £16 10s. About one-half of the product is sent direct to London, where one-half is consumed, while the remainder goes for ships' stores, is exported to the colonies, and sent to the provincial towns of England. One half of the produce not sent to London is distributed over Germany, and there is some demand from France and Russia. The success of the condensing factory depends entirely upon the ability to put a fine flavoured perfect article into the market. The milk must be uniformly good, and a fastidious neatness and cleanliness must be observed in the establishment. The milk is evaporated down in vacuo at a uniform temperature of 160 deg. Fahr., with the addition of the best refined white sugar, until it reaches the consistency of thick syrup or honey. It takes about seven hours to condense the milk, 75 per cent. of its original bulk in water being driven off. The condensed milk thus prepared has been preserved in good condition for years. Mixed with three to four pints of water it readily dissolves, yielding a somewhat sweet but agreeably tasting fluid having a flavour of boiled milk. It consists of nothing but cows' milk and the best white sugar, and is well adapted for use during long voyages and in all other situations where good cows' milk is not readily procurable. A sample of preserved milk prepared by the Anglo-Swiss Company on analysis yielded the following results in my laboratory:

Water	24.89
Fat (pure butter)	8.36
Caseine (curd)	10.15
(containing nitrogen)	(1.624)
Milk and sugar-cane	54.18
Mineral matter (ash)	2.42
	100.00

About one-half of the sold substances of the condensed milk consists of sugar added in the process of condensation. The remainder consists of butter, caseine, milk sugar and ash constituents. It is but right to state that the analyses of other samples of preserved milk prepared by the Anglo-Swiss Company show about ten per cent. of butter and somewhat less water than I found in the sample analysed by me. Those who take a special interest in the manufacture of condensed milk will find a full account in a highly interesting paper, illustrated by many woodcuts giving a full description of the necessary apparatus and the processes of manipulation, by Mr. X. A. Willard, of Kerkimer, New York, published in vol. xv, new series, Part I, 1872, of the 'Journal of the Royal Agricultural Society of England. The success of the Anglo-Swiss Company naturally created competition. Condensed milk factories were established at Gruyères, and half-a-dozen other places in Switzerland, in Bavaria, in Holstein, in Ireland, and in England; but failing to produce first quality preserved milk, and wanting in prestige and other causes they have ceased to manufacture, with the exception of Mr. Newman's Irish Condensed Milk factory at Mallow, near Cork, and the English Condensed Milk Company, whose works are at Aylesbury, Buckinghamshire. The two last put their milk into the market in 1870, and it is stated upon good authority that neither the Swiss nor the English Company has lately been able to supply the demand for their products.

REMARKS ON FOOD APPROPRIATE FOR PRODUCING MUCH AND GOOD MILK.

The time at my disposal will not allow me to enter fully into this part of the subject, bearing upon milk supply. The influence of food on the quality of milk is very striking. A half-starved cow yields but little milk, and poor milk. On the other hand, the liberal supply of peas, or bean meal, or oil cake, and other foods rich in nitrogenous and phosphatic elements of nutrition, tells directly both on the quality and quantity of the milk. Nothing, therefore, can be more injudicious, because unprofitable, than to stint milch cows in food. The finest flavoured milk and butter, I need hardly remark, are produced by cows fed in summer entirely on grass and rich permanent pastures, and in winter on nothing else but hay, made of fine sweet grass. Few persons, however, have either the opportunity or can afford the luxury of keeping cows all the year round on grass or hay; and dairy farmers, either in town or in the country, in order to carry on a profitable trade, find it

necessary to make use of turnips, mangolds, meal, brewers' grains, bran, rape, linseed, and cotton cake, palm-nut meal, and other auxiliary kinds of food. Turnips yield a watery milk, and are objectionable on account of the turnipy flavour which they give to the milk. Mangolds are less objectionable, but should not be given to milk cows without an allowance of 3 to 4 lbs. of meal per head. Of all kinds of meals, none is equal in milk-producing propensities to bean or pea-meal—a fact which finds a ready explanation in the circumstance that bean or pea meal contains, on an average, from 25 to 28 per cent. of nitrogenous constituents, or the same class of compounds to which the curd of milk belongs, and that it is likewise rich in phosphates, or bone-earths, in which milk abounds. Egyptian lentils, when they can be procured, answer equally well with bean-meal, for they resemble intimately in composition beans or peas. Linseed cake produces much and rich milk, but unless it is pure and fresh cake of the finest description, it seriously injures the quality of the milk, and I would warn especially against the use of inferior, mixed, or adulterated cheap linseed cakes, which are so frequently sold as genuine linseed cakes, for such cakes give a bad flavour to milk, and often injure the health of the cows. One of the best and most economical kinds of cake for milk cows is decorticated cotton cake. Fine decorticated cotton cake is both rich in fat and in nitrogenous constituents, and like all food rich in nitrogen, it also contains a large proportion of phosphates, and is thus admirably well adapted for milk cows. In order to make the best use of decorticated cotton cake, it is desirable to reduce it to a coarse powder, and to mix the powdered cake with Indian corn or barley-meal in about equal parts. If this cake cannot be conveniently reduced to powder I would suggest its being soaked in water after having been passed through a cake-breaker. By this means the cake becomes softened and is rendered more digestible than it is when it is given to cows in hard, dry, rough pieces. Rape cake is likewise an excellent food for milk cows, provided it is free from an undue admixture of wild mustard seed, which frequently occurs in rape cake made from Indian seed to an extent which renders it perilous to stock. The best rape cake is green German rape or Rubsen cake, one of the cheapest and best concentrated kinds of food that can be given to milk cows. Bran or pollard, as is well known, produce good and rich milk. Nothing can be better as an auxiliary winter food for milk cows than 4 lbs. of bran made into a thin mash, to which about 3 lbs. to 4 lbs. of bean meal is added. Along with this about 25 lbs. of mangolds, and a due proportion of hay or hay and straw chaff, will supply a food mixture which produces much and first quality milk. Brewers' grains are the staple food in town dairies, for at the price at which grains can be bought in large towns, there is no food which equals brewers' grains for producing good milk in the most economical manner. Brewers' grains, I find, are much more nutritious than their appearance seems to warrant. Even in the wet condition in which they are obtained from the breweries, and holding from 75 to 77 per cent. of

water, they contain a fair proportion of ready-made fat and flesh-forming matters. Desiccated grains contain from seven to eight per cent. of oil, and about 18 per cent. of nitrogenous compounds. Dried brewers' grains make good milk, and, in my judgment, are fully as valuable as a food for milk cows as barley meal. Another useful and, comparatively speaking, cheap food for milk cows is palm-nut meal. The quality and value of samples of palm-nut meal differ greatly. Some contain a large proportion of oil and fatty matter; others, like all the samples which come from abroad, contain seldom more than 12 per cent., and occasionally as little as two or three per cent. of oil and fatty matter. The best palm-nut meal is made in England by Messrs. Alexander Smith and Co., Kent Street Oil Mills, Liverpool, who guarantee 19 to 20 per cent. of oil and fat in the meal they sell. This meal is made from the partially-expressed kernels of the palm nut, and its value as a food for fattening stock or for milk cows depends principally upon the proportion of fatty matter which is left in the meal. The fatty matter in palm kernels is a white agreeably-tasting fat, of almost the same consistency as butter. English palm-nut meal, when rich in fat, added to bean meal, or decorticated cotton cake reduced to powder, is an excellent auxiliary food for milk cows, producing much and good milk, rich in butter. Brewers' grains, together with an allowance of 20 lbs. of mangold, 3 lbs. of palm-nut meal, and 3 lbs. of decorticated cotton cake, or 3 lbs. of bean meal, and a sufficient quantity of mixed straw and hay chaff, is perhaps as cheap and good a diet for milk cows as any. This diet yields much in rich milk, and keeps the cows in a first-rate condition. One word respecting the use of grass from land irrigated by sewage. A good deal has been said and written for and against feeding milk cows upon sewage grass. On the one hand, sewage grass has been praised as the most nutritious kind of grass for milk cows, and, on the other, the adversaries to all schemes of applying sewage to land, in the face of actual special experiments with sewage grass, and the experience of dairy farmers at large, have endeavoured to prejudice the public mind by denouncing the produce from grass land irrigated by sewage as innutritious and a highly dangerous food for milk cows. Like all very succulent produce, the grass from sewaged land is more watery, and, in consequence, not so nutritious as the produce from rich permanent pastures. It is, nevertheless, a most acceptable food to the dairy farmer, who usually gives along with it to his cows some bean or other description of meal or auxiliary concentrated food, and, under proper management, there is not the slightest ground for suspecting that sewage grass, when given to milk cows, will render the milk they yield unwholesome or dangerous to the youngest child. If sewage could not be usefully applied to Italian rye grass to be turned into milk and butchers' meat, all sewage-irrigated schemes would long ago have fallen to the ground. Convinced as I am that the produce from a properly-managed sewage farm supplies an increased amount of good and wholesome food, the greater part of which is especially useful to cow-keepers, I can only express the

hope that all town authorities who at present allow large quantities of plant-food to run to waste, polluting our rivers and watercourses, will ere long set apart a portion of land, if such can be found appropriate for sewage irrigation, on which Italian rye grass, cabbages, and mangolds can be raised in large quantities by means of sewage, for the special advantage of cow-keepers, and the benefit of the community at large.

Milk Adulteration.

Milk is a whitish liquid, of an agreeable, sweetish taste, and faint but pleasant odour, depending in some measure upon the nature of the food upon which the cows are fed. It is essentially an emulsion of fatty particles in a solution of caseine and sugar of milk. The fatty matter is not contained in milk in a free state, but enclosed in little cells of caseine, which occurs also in milk in a state of solution, and is precipitated spontaneously as curd when milk gets sour. Viewed under the microscope, milk appears as a transparent fluid, full of small, round, or oval, and more or less angular bodies—the so-called milk globules. When milk is left undisturbed for some time, these milk globules rise to the surface, forming the cream of milk. Skim-milk has a bluer colour, and is more transparent than new milk, containing its full share of milk globules, or cream or butter globules. In the course of my experience as an agricultural chemist, I have made, as may be supposed, a great number of milk analyses, and paid special attention to the various circumstances which affect the composition and quality of milk. As already stated, the amount and quality of the food given to cows exercises a most remarkable influence on the quality and composition of milk. Besides this, the season of the year, distance from the time of calving, the breed and size of the cows, and several other circumstances which will suggest themselves to practical men, have a greater or less influence on the yield of milk and its quality.

Admirable illustrations of this will be found in my paper "On Milk," published in the 'Journal of the Royal Agricultural Society of 1863.' I may, however, be allowed to refer to a series of milk analyses which I made when residing at Cirencester College, with a view of ascertaining what may be the variations in the course of a year in the quality of milk on one and the same farm. I took samples of the milkings of all our milch cows, and analysed the morning's and evening's milk of the first or second day of each month. The milch cows were out at grass from May till the end of October, and as the herbage then became so scarce as not to afford sufficient nourishment, they were fed in the evening at the stall on roots and hay, &c. It will be seen by the appended analyses that both the morning's and evening's milk in September were extremely poor. The poverty of this milk was therefore evidently due to an insufficient supply of food. The milk produced on two other farms in the neighbourhood during the same month, on being analysed, was found to contain $12\frac{1}{2}$ per cent. of solid matter, including $3\frac{1}{2}$ per cent. of fat (pure butter), and the same percentage of curd, show-

ing that on both farms where the cows were supplied with a sufficient amount of nutritious food the milk was of good quality, whereas on the college farm the scanty supply of poor grass had the effect of producing poor milk containing 90 per cent. of water, and only 2 per cent. of fat. The influence of food on the quality of milk was also clearly visible in the cows of the college farm. On account of the insufficiency of the grass, the cows were driven into the stall and there supplied with roots, hay and meal. The milk became better at once, for the morning's yield then contained $12\frac{1}{2}$ per cent. of solid matter, and in this nearly 4 per cent. of butter. The concentrated food which the cows received in the evening was evidently made into good rich milk during the night. At this time the cows were put on grass early in the morning, and allowed to pick up what they could. This was not much, as their anxiety in the evening to be let into their stalls clearly showed. The influence of a stinted supply of grass was noticed at once in the poverty of the evening's milk. The percentage of solid matter fell to $9\frac{2}{3}$ instead of $12\frac{1}{2}$ per cent., and the butter to 3 instead of 4 per cent. I would direct especial attention to the fact that these analyses were not made from the milk of a single cow, but of the whole herd, and as the milch cows were kept entirely for the use of the college, there can be no question as to the genuineness of the supply.

Composition of Morning and Evening's Milk, produced on the Royal Agricultural College Farm, Cirencester.

		Percentage of					
		Water.	Butter (pure fat).	Caseine and albumen.	Milk-sugar.	Mineral Matters (ash).	Nitrogen.
January	Morning	87·70	2·60	2·94	5·82	·94	·47
	Evening	87·40	2·28	2·87	6·56	·89	·46
February	Morning	87·50	2·58	3·44	5·44	1·04	·55
	Evening	86·40	3·53	3·37	5·56	1·14	·54
March	Morning	88·60	2·71	2·43	5·35	·91	·39
	Evening	88·16	2·96	2·62	5·55	·77	·42
April	Morning	87·50	3·15	2·94	5·60	·81	·47
	Evening	89·00	2·47	2·69	5·08	·76	·43
May	Morning	88·20	2·42	3·12	5·49	·77	·50
	Evening	87·80	2·71	2·87	5·85	·77	·46
June	Morning	87·30	3·05	3·00	5·89	·76	·48
	Evening	87·30	2·94	2·87	6·05	·84	·46
July	Morning	88·70	2·22	2·94	5·38	·76	·47
	Evening	87·80	3·61	2·81	5·10	·68	·45
September	Morning	89·91	1·99	2·94	4·48	·64	·47
	Evening	90·70	1·79	2·81	4·04	·66	·45
October	Morning	87·60	3·90	2·87	4·84	·79	·47
	Evening	90·30	2·99	2·37	3·76	·58	·38
November	Morning	87·10	3·41	2·94	5·41	1·14	·47
	Evening	86·20	3·78	3·19	5·68	1·15	·51
December	Morning	86·70	3·74	2·87	5·92	·77	·46
	Evening	86·00	4·12	3·62	5·46	·80	·58

I have alluded specially to these variations in the quality of milk as influenced by food, because some statements have lately appeared in a little work on milk—analysis written for the special benefit and instruction of food-analysts, "a new class of men," which has lately been "constituted to watch over the food of the country." I leave it to you to form your own opinions from the following extracts taken from this treatise. According to the author, country milk of average quality contains in 100 parts by weight:

Water	87.55
Fat	3.08
Caseine	4.04
Milk-sugar	4.62
Ash	.71
	100.00

Town-fed milk, according to his analysis, contains in 100 parts by weight:

Water	85.94
Fat	4.00
Caseine	5.02
Milk-sugar	4.31
Ash	.73
	100.00

It will be seen that the latter milk shows a difference of one-third more of fat and one-quarter more than the amount of caseine contained in the former, and a correspondingly smaller amount of water. These differences are sufficiently striking to show, at all events, that milk has not a uniform composition. Nevertheless, our author says, "Milk exhibits great constancy of composition; the effect of variations in the diet of the cow, showing itself in the amount of the secretion, rather than in its quality;" and again, "As will be readily comprehended, this constancy of composition is a cardinal fact in milk analysis. If milk were variable in strength, as urine is, chemical analysis would fail to detect the watering of milk. That milk is a secretion of constant, or only slightly varying, composition, lies at the very root of the subject of this treatise." In the face of the evident contradictions between the facts given and the opinions expressed by this same author, I think I need not detain you by criticising other portions of the treatise, but leave you to draw your own conclusions of the value of the frequent use he makes of what he calls "normal milk." One might as well talk of "a normal potato," or a "normal cabbage," or a "normal pig." On passing along on the top of an omnibus a short time ago, I was somewhat amused at seeing an advertisement of a wine merchant of his "standard sherry," and I am surprised that standard or "normal" milk is not advertised, as it might be with quite as much reason as "standard sherry."

A great deal has been said and written about milk adulteration. Sheep's brains, starch, chalk, and pipe clay, which are said—on what authority nobody has ever decided—to have been found in milk, only exist in the imagination of credulous or half-informed scientific men, who, in want of more profitable occupation, take to book writing. It would be difficult to understand where all the sheep's brains should come from; nor is it probable that chalk or other insoluble substances not easily kept in suspension, should be employed in adulterating milk. I have never found myself, nor have I ever met any chemist who has found any of the clumsy adulterations referred to in popular treatises on food. Milk adulteration resolves itself into one of two things—either the addition of water, or the abstraction of cream—and the question which naturally arises is, Can we detect to a nicety how much water has been added, or how much cream has been extracted from a given sample? I have, perhaps, had as much experience in the examination of milk as anybody in England, and I fearlessly say that, owing to the natural variations in milk, it is utterly impossible to ascertain whether in all cases a small quantity of cream has been removed from milk, or an inconsiderable proportion of water has been added to it; and I further maintain that it is a reckless proceeding on the part of any analyst to assert that milk has been adulterated with exactly 8 per cent. of water, or with 13·75 per cent. of skimmed milk, as in one case, or with 16·25 per cent. as in another. Such assértions can only be made by young and inexperienced men, for whose special instruction such milk treatises as I have above referred to are compiled. No wonder that men who entertain such inconsistent views of "normal milk" should be led to give reports in which they positively assert that they have found 16·25 per cent. of skimmed milk, because the amount of fat did not come up to their standard by a few decimals. I may state, in passing, that in a recent case the milkman, who was accused of selling milk adulterated with 16·25 per cent. of skimmed milk, was fined in the "mitigated penalty of £5," with the alternative of ten days in gaol. In the course of the trial, testimony was given by a worthy town councillor, who had carried on business as a temperance hotel keeper, that the accused had been known to him for the last twenty years, and had during the whole of that time supplied him with milk. He further expressed his opinion that no better milk was to be obtained than that of the accused, against whom he had never known any complaint. A well-known chemist, moreover, was called for the defence, and, on the strength of the analyses, pronounced the milk to be of the quality of good ordinary country milk, and quoted, in support of his opinion, no less an authority than that of the late Professor Johnstone, apparently to no purpose, because the amount of fat contained in the milk differed in a trifling extent from what the food analyst conceived to be the amount contained in "normal milk." A medical man, called in support of the prosecution, gravely stated that milk containing 16·25 per cent. of skimmed milk would be prejudicial to the health

of the very young, although its effects would be hardly appreciable on an adult. Instances of this kind would be very ludicrous but for the serious consequences involved, and the injustice which, no doubt, is frequently dealt to honest dealers. Let it, however, be clearly understood that I have no intention of throwing cold water upon the system of chemically examining milk. All I desire to show by these observations is that milk analyses should be conducted by men upon whose practical experience and acquaintance with the subject reliance can be placed. Chemical analyses can do much in the way of revealing adulteration of food, and there is no difficulty in discovering whether milk has been skimmed or watered to any great extent. As the result of my own experience I may state that milk may be considered rich when it contains from 12 to $12\frac{1}{2}$ per cent. of solid matters, 3 or $3\frac{1}{2}$ of which are pure butter. If it contains more than $12\frac{1}{2}$ per cent. of solid matter, and has 4 per cent. or more of fat, it is of extra rich quality. Such milk usually throws up from 11 to 12 per cent. of cream by bulk after standing for twelve hours at 62° Fahr., and has a specific gravity varying from 1·028 to 1·030. Good milk of fair average quality, as has been stated already, contains from $10\frac{1}{2}$ to 11 per cent. of dry matter, and in this about $2\frac{1}{2}$ per cent. of pure fat. It yields 2 to 10 per cent. of cream, and has a specific gravity of about 1·030. Poor milk contains 93 per cent. or more water, and has a lower specific gravity than 1·027. Such milk yields not more than 6 to 8 per cent. of cream. Skimmed milk throws up still less cream, has a bluer colour, and is more transparent, and when undiluted with water has a slightly higher specific gravity than new milk. Good skimmed milk has a specific gravity of about 1·033, and poor skimmed milk 1·028 to 1·030. Milk purposely watered yields only 5 to 6 per cent. of cream, and invariably has a lower specific gravity than 1·025. If milk is both skimmed and watered, it yields less than 4 per cent. of cream, and possesses as low a specific gravity as 1·025 to 1·026. A great many experiments have led me to the conclusion that within certain limits the specific gravity is the most trustworthy indicator of quality. Some of the objections to the use of hydrometers or instruments for taking with accuracy the specific gravity of milk, are based on the mistaken opinion that cream is lighter than water. This, however, I have ascertained, is not the case. Cream, I find, is lighter than milk, but denser than water, in the proportions of 1·012, or even 1·010 to 1·000. The addition of cream, therefore, cannot depress the specific gravity of milk in the same degree as the addition of water. A low specific gravity thus always indicates a large proportion of water; at all events I find that milk rich in butter is of a specific gravity a good deal higher than that of milk adulterated with even a little water. Some years ago I made some accurate gravity determination of pure milk before and after skimming, and of samples mixed purposely with 10 to 50 per cent. of water.

	Sp. Gr. at 62° Fahr. Before skimming.	Sp. Gr. at 62° Fahr. After skimming.
Pure milk	1·0314	1·0337
With 10 per cent. of water .	1·0295	1·0308
„ 20 „ „ .	1·0257	1·0265
„ 30 „ „ .	1·0233	1·0248
„ 40 „ „ .	1·0190	1·0208
„ 50 „ „ .	1·0163	1·0175

It appears from these results that good pure milk has a specific gravity of 1·030; skimmed milk a little higher; and, further, that milk, having a specific gravity as low as 1·025, is either mixed with water, or is naturally very poor. If the gravity should sink to 1·023 or less, it is unmistakably mixed with a considerable quantity of water. A useful instrument for approximately determining the percentage of cream is a graduated glass tube, at the top of which the cream may be allowed to collect, and its quantity may be read off. There can be no doubt about the fact that, before the late Adulteration Act the milk of London was shockingly adulterated, and that it was high time that a check should be placed upon the malpractices of milk-dealers. I am, however, anxious that the Act should not become ridiculous in the eyes of a discriminating public, for several recent milk prosecutions have shown that the wisdom of the wise (food analysts) in more than one or two instances is truly foolishness, even in the sight of an ordinary dairyman. I should advise rigorous prosecution in every case of flagrant or unmistakable adulteration; but whilst those entrusted with the enforcement of this Act draw the line so finely as they too frequently do at present between pure milk and that which has been tampered with, serious mistakes must and will necessarily arise, to the discredit of all concerned in the matter, and sometimes, perhaps, to the irrecoverable loss of the reputation of an innocent man.

"The limits of the time which may be reasonably devoted to the proper introduction of the subject on the card have not allowed me to discuss as fully as I should have wished some of the points to which I have referred. The subject has a very wide range, and I am painfully conscious of the imperfections and omissions, which the members of our club will not fail to recognise in my discourse. I trust, however, that the discussion which will follow the reading of this paper will make amends for the defects, which could not be avoided altogether."

Mr. Neal, after acknowledging the indebtedness of the members of the Club to Dr. Voelcker for his paper, said he had anticipated much of what had been said in regard to the analyses of milk made by persons suddenly placed in a responsible position. They reminded him forcibly of the inspectors of cattle, and there was much to complain of. As a practical man he wished to make a few remarks, and though these might not be in harmony with the opinions

of Dr. Voelcker, yet they would give him credit for sincerity. (Hear, hear.) He was very much surprised to hear Dr. Voelcker eulogise so highly brewers' grains, because he believed it was not very advisable to use them as food for dairy cows. There was a great deal in what had been said in reference to the milk being affected by the quality of the pastures, but he held that it was not the richest of grass that was best adapted for producing rich cream or good cheese. Some of the finest cheese made in Cheshire was made from milk produced by cows fed on pasture the very reverse of rich. That was a mystery that had yet to be solved. On the farm he occupied some twenty years ago in Cheshire there was one large pasture off which he could get the richest of butter, but no cheese at all. As farmers they must consider what was the best way to deal with their stock. They ought not to wear them out by pulling at the udder—not to milk them to death, but so keep them that after service in the dairy they could be sent to the butcher, and make excellent beef. It would cause much loss if they let their dairy cows lay out at night in the autumn, winter, and early spring. He kept 60 dairy cows, but during the whole of last year he had housed them at night. They should also pay a great deal of attention to feeding. He was one of those who were most reluctant to meddle with foreign or imported foods, whether cake or anything else. He preferred keeping to the produce of his own country. (Hear, hear.) If malt culms were mixed with the turnips after they were pulped, and before they were given to the cows, the flavour of the butter would not be affected. Malt culms also increased the quantity of the milk, and therefore he could not use a stronger argument in favour of the repeal of the malt tax. (Laughter.) He had found bean meal better than pea meal, but oatmeal was better than either. In conclusion he said that as the cost of production was 33 per cent. more than it was a few years ago, the farmers of England must see whether or not it was possible to increase the amount of their produce. If not, the prospects of agriculturists were very dark indeed.

Mr. Allender said that in the matter of securing the transit of milk in a sweet and sound condition, all they wanted was common sense and ordinary care. Much prejudice had been excited in the minds of medical men, and through them in the minds of the public against country milk. This prejudice was not owing to any fault on the part of the farmer or to the supposition that milk could not be sent from any distance in a perfectly good condition; but to the fact that milk was badly packed and received bad treatment during transit. A large amount of excellent beef was received in London from Aberdeen, but unless care was taken in the packing of the meat, and it received due attention during transit, it would not be fit for food at its journey end. If proper care was only taken to pack the milk, it would arrive as sweet as when it left the farm. He directed attention to two milk cans in the room—one of them being the old pattern still in use, and the other an improved can which

received the gold medal of the Society of Arts some three or four years ago. The distinguishing feature in the latter was an inner lid, which prevented dust or any impurities getting into the milk during transit. Its cost was only 10s. more than that of the old pattern tin, and yet the manufacturer, Mr. Bernard, of Holborn, had never had an order for them. There was another cause why country milk had got a bad name, and that was owing to the action of the public authorities. The officers of the hospitals, workhouses, and other institutions in London, periodically advertised for tenders for the supply of milk, and invariably they accepted the lowest tender. From personal knowledge he had of the matter, he could say that most of those institutions had been supplied with milk for several years at a price far below that at which honest London dealers were supplied by honest country farmers. This proved that some dishonesty was practised somewhere. From these facts it was proved that the Guardians of the poor of London actually with the one hand encouraged the very system of adulteration which with the other hand they were trying to put down. (Hear, hear.) There was not the slightest doubt that country milk could be brought to London in as good a condition as it left the country; and he maintained that country milk was better than London milk, for it had a finer flavour and was richer in cream. But the reason why such poor country milk had been supplied in London was because the price had been so "ground down" by the large institutions that dealers had been compelled to come to an understanding with the farmers that the morning's milk was to be skimmed and then mixed with the evening's milk. He then referred to the action of public analysts under the Adulteration Act, and said some assurance ought to be given by the authorities that such officers shall be really competent men. He stated that he had recently sent samples to three eminent analysts unknown to each other, in order to get a true test of the milk of a particularly good cow. He sent two samples to each—one the milk as drawn, and the other with 10 per cent. of cream taken off. All three gentlemen gave substantially the same results. The percentage of solids in the one was 12·9, and in the other 10·1. One of the public analysts had lately stated that no milk could be pure unless it contained 12 per cent. of solids, and that this was a far-fetched statement and likely, if acted upon, to do serious injury to the vendors of milk he had recently taken steps to prove. He had a sample of milk as it was drawn from the cow in his presence sent to this particular analyst requesting an analysis. His request was complied with, and the result was that there was $10\frac{1}{2}$ per cent. of cream, while the proportion of solids was 9·90. Accompanying the analysis was the statement:—"This sample looks quite right. The solid residue is much too low, but that may be in the drying." Thus the analyst admitted that the small proportion of solids might be due to his manipulation. This milk was, however, perfectly pure; and this should be a caution to analysts not to adopt the doctrine that all milk is adulterated that does not show a percentage of solids equal to 12 per cent. He

concluded by speaking in favour of the Adulteration Act, which, in the course of a few years, when analysts had become proficient in their work, would be proved to be a good one, but until then some standard ought to be fixed that should be equitable both to the vendors and the public.

Mr. Collisson Hall, as one of the largest dealers of milk in the Metropolis, protested against the statement of the last speaker, that because the hospitals were supplied at a cheap rate the milk was necessarily impure. It would be grossly unjust to the medical officers of such establishments if it went forth to the public uncontradicted that they allowed their patients to be supplied with impure milk. He contended that vendors of milk had a right to supply the article at what price they pleased. He had for many years served one of the largest hospitals in London, whose custom he would not lose at any price, because of the immense amount of custom which that fact brought to him. With reference to the amount of water in milk, it should be remembered that there was a much larger proportion of water in the milk of a Dutch cow than in that of an Alderney cow; therefore it was absurd for analysts to pretend they could tell whether milk was adulterated with water in the small proportion of five per cent. Still it would be unfair to condemn the analysts, because at present they were only learning their duties in a majority of cases; but in a short time they would become perfect. As to sewage grass, he believed it to be perfectly wholesome food for cattle, but of course they should not be fed entirely upon that sort of food; it should be mixed with something else. In regard to accommodation he said that from experience he found from 50 to 75 cows could be advantageously housed under one roof. The shed should, however, be well ventilated and properly disinfected with carbolic acid. He must say a few words about the foot and mouth disease, which had made such ravages in this country. Recently he had sent some calves to market, and whilst there they came in contact with cattle that had the disease, so that though they were by a first-rate Short-horn bull, he was compelled to sell them for 18s. rather than risk the spread of the disease. Some law ought to be passed compelling animals found by the inspectors suffering from disease to be killed on the spot, and so prevent their coming in contact with healthy cattle. As to pleuro-pneumonia, he had practised inoculation with most satisfactory results, and considered this a safe and effectual remedy for the disease.

[Some remarks here made by a member of the Club had the effect of compelling the Chairman to close the discussion, in consequence of which Dr. Hardwicke and other gentlemen who desired to speak to the question were obliged to withhold their observations.]

Dr. Voelcker, in reply, maintained that considering the amount of nitrogenous matter contained in brewers' grains, there was no cheaper or better description of food for producing milk in a more economical way. Of course he did not mean they should constitute the entire food of milch cows; but that a fair proportion of good meal should be mixed with them. With regard to the statement

that the best butter and cheese could be produced from poor pasture, he expected that the solution of this problem was to be found in the fact that natural herbage would produce richer and better milk than the grass in highly cultivated fields. The more mixed the herbage is, and the greater number of odoriferous plants growing amongst it, the richer was it as food for cattle; but the more rank and luxuriant the herbage caused by high farming and manuring, the poorer it was, all the finer sorts of grass being eliminated by the rank growth. The former produced milk rich in fatty matter, and the latter, being more watery, produced an inferior description of milk. They could not get a large quantity and high quality off the same pasture. If the pasture was scanty but rich, it would produce really rich milk, but in smaller quantity.

On the motion of *Dr. Hardwicke* a hearty vote of thanks was accorded to Dr. Voelcker for his able paper.

The Chairman was also thanked for presiding, on the motion of *Mr. C. S. Read, M.P.*

The meeting then broke up. The discussion is extracted from the *Norwich Mercury*.

ON FOOT-AND-MOUTH COMPLAINT OF CATTLE AND OTHER ANIMALS; WITH REMARKS ON THE GENERAL CHARACTERS OF THE DISEASE AND THE CAUSES WHICH LED TO ITS RECENT EXTENSIVE PREVALENCE IN THIS KINGDOM.

By G. T. Brown, Chief Inspector in the Veterinary Department of the Privy Council, and Professor of Physiology and Therapeutics in the Royal Veterinary College.

(*Continued from p.* 193.)

Cattle are the more liable to loss of hoof, when suffering from foot-and-mouth disease, if the hoofs are overgrown and much elongated at the toe. The leverage thus obtained is detrimental to the structure even of the healthy foot, and becomes still more injurious when the connection between the hoof and its secreting membrane is loosened owing to exudation from the vascular surface. The feet of cattle and sheep should be carefully trimmed when necessary, even before they are attacked by the disease if possible; but in any case excessive growth of horn should be removed by saw and rasp to save the animal from the injuries which are likely to occur if those parts are allowed to remain in this distorted state during the progress of the disease.

Complete rest at the early stage of the disease, when the

feet are attacked, is therefore quite an essential part of the curative treatment. Animals which are kept in houses will naturally be exempt from the danger of injuring their feet by moving about, and those which are at pasture, either sheep or cattle, may be temporarily kept from moving about by the use of rails and hurdles to form an inclosure, where there are no convenient sheds in which they may be sheltered.

A dry floor with plenty of clean litter cannot be dispensed with, and the feet must be kept perfectly clean; all foreign substances which have accumulated between the digits must be removed, and the feet afterwards well syringed with an antiseptic or styptic solution. Four ounces of common nitre to a gallon of water will make a lotion which is very effective in the early stage of the disease; it may be used with a common syringe two or three times a day. Large vesicles between the digits or on the heels, if they are full of fluid, should be punctured in order to prevent the mechanical effects of fluid pressure, and any portions of the separated horny tissue which becomes blackened and rotten should be cut away with scissors, as they will increase the irritation and prevent the secretion of new horny structure of proper density.

Powerful astringent applications, which will arrest the discharge altogether, are not proper for the feet; indeed, their use is likely to cause active inflammation of the parts, which otherwise would only suffer from irritation; but if the nitrate of potash does not sufficiently control the exudation from the diseased surface, a solution of chloride of zinc, one part of Sir W. Burnett's fluid to fifty parts of water, may be used instead.

Carbolic acid in solution, of the same strength as the zinc lotion, is also a very good application.

Alum-water, made by dissolving an ounce of alum in a quart of water, is more decidedly styptic than either of the other lotions, and may be resorted to when they are not sufficiently potent to arrest the exudation from the diseased membrane.

The mildest remedy—the nitre lotion—should always be used in the first instance, and during the continuance of fever. The more active solutions may be employed when the thermometer indicates a return to the natural temperature, not exceeding 102 degrees.

After all the local inflammation or irritation has subsided, and the exposed membrane of the internal foot becomes covered with healthy horn tissue, a coating of common tar

will be useful as a protection to the newly developed structure, but, while active disease is present, this material, so commonly used, often mixed with caustic agents, adds to the local excitement, and embarrasses the surgeon by obscuring his view of the diseased parts.

When the udder is implicated in the disease, as it often is even in the mild form of it, great attention must be paid to the part, especially when the animals are in milk. The most simple manifestation of the affection in this region is the development of a few vesicles on various parts of the integument covering the gland, frequently on the teats, even on the apex round the opening of the canal.

Swelling with redness and heat may affect the whole gland, or be confined to one quarter, and in many cases one or two quarters are painful and very hard to the touch.

Local treatment of the udder will be necessary, in addition to the other means which have already been recommended.

When swelling and pain are present, fomentations must be frequently employed for some days until the active disease has subsided. All astringent and styptic applications at this time are to be avoided, as likely to increase the excitement.

If no active irritation present itself, or otherwise if the inflammatory signs have been subdued by soothing treatment, mild astringent applications are useful. Thus, when the vesicles first appear on the teats or other parts of the udder, the application of the alum-wash, composed of one ounce of alum to a quart of water, will lessen the tendency which always exists to the separation of the cuticular tissues from the vascular membrane beneath, and at the same time diminish the irritation. Some benefit will also be expected to arise from the antiseptic properties of the solution. Carbolic acid has been used for this purpose, but dairymen object to it on the ground that it imparts a smell and flavour to the milk—a property which is, in reality, on sanitary grounds, altogether in favour of its use, as the fluid would thereby be prevented from coming into consumption.

One other point must be sedulously attended to in all cases where the udder is affected, no matter to what extent; the animal must be regularly and effectually milked; retention of this fluid in the gland is certain to add very seriously to the amount of mischief which is going on, and there is

good reason to apprehend that much harm is constantly done by neglecting this precaution. Owing to the tenderness of the udder the cow naturally resists the attempt to remove the milk, and the attendant, under the circumstances, is not disinclined to escape a troublesome work, or, at best, to perform it so imperfectly that it might as well have been left undone. It cannot be expected that the owner of the sick animals will be able to superintend all the important details of treatment on which success depends; and it is usually the case that any ill consequences, which are due to early neglect of simple remedies, are attributed to the virulence of the disease.

Separation of the epithelial tissues of the mouth and tongue in cases of eczema is not of so much importance as separation of the horn tissue, and therefore need not be so carefully guarded against. When the affection exists in the mitigated form which it usually assumes, the mouth requires no attention, and in the worst cases nothing more powerful than a solution of tannic acid, in the proportion of one ounce to a gallon of water, will be required. This solution may be used as a lotion twice a day, when the loss of epithelium is considerable, and the soreness of the mouth consequently extreme. About half a pint of the lotion should be gently poured into the mouth, and then, after the head has been for a moment slightly elevated, to cause the fluid to run to the back of the mouth, it may be permitted to flow out again. Should the whole quantity, however, be inadvertently swallowed, no harm will arise.

Tannic acid coagulates the albuminous material of the exudation, and thus furnishes a protective covering of some tenacity, while it lessens irritation by causing the minute vessels which are charged with blood to contract, thus lessening the pressure on the nerve-fibres.

The third indication—that is, the support of the system under the debilitating effects of the disease—is to be carried out principally by careful attention to the diet. When the mouth is sore the animal is disinclined to use the tongue or lips to collect its food, therefore it is necessary to perform this preparatory process for it. Cattle at pasture require that the grass be cut and placed in little hillocks near them. Roots must be sliced into long thin pieces, which may be grasped without difficulty between the lips. Hay will usually be taken readily; portions of oil-cake, if introduced into the side of the mouth by the fingers, and placed within reach of the back teeth, will be masticated freely. Pulped roots, and mashes containing a fair proportion of meal, may also be

offered by way of varying the diet. Oil-cake, softened and mixed with water to form a gruel, will be of great value when an animal's mouth is so sore that it is only capable of sucking in such bland and liquid food. Tonic medicine will not be necessary in ordinary cases, careful nursing will be sufficient; but it must be remembered that, in the absence of attention to the diet, the sick animal's chances of recovery are reduced to a minimum.

This point was brought out very prominently during the inquiry which has been already referred to in 1869 in Somerset. In the district which extends for many miles round Glastonbury, the homesteads are small, and the pastures extensive; from the Tor the prospect extends as far as the eye can reach in all directions—one vast plain of feeding ground. It may be imagined how quickly the disease would spread among hundreds of cattle feeding on these pastures, and only separated by wire fences or narrow dykes; but the severe form which the affection assumed was mainly due to the want of facilities for supplying the numerous herds with sufficient aliment at a time when the system required a liberal allowance of restoratives; the sick beasts could not crop the herbage on account of the soreness of their mouths, and presumably owing to the extensive surface over which the cattle were spread, it was found impossible to supply them with food artificially prepared, or even to cut the grass and place it within their reach; at any rate it was not done, and the result was that, as it happened, on many commons and large pastures in other districts animals suffered from inanition in addition to the debilitating effects of the disease.

The system of medical and dietetic treatment which has been suggested will be applicable to all animals that are liable to the disease; but differences in the details of practice will be necessary under the varying conditions of each subject.

Sheep, although their feet are always attacked, under ordinary care suffer much less than cattle from destructive changes in these parts, perhaps on account of the less weight which they have to sustain. There is, besides, a wonderful reparative power in the vascular membrane of the feet of sheep, which renders the loss of the entire hoof a comparatively trifling accident, capable of being rectified in a few weeks. Nevertheless, the feet of the sheep affected with foot-and-mouth complaint require considerable attention; and although it becomes almost impossible to apply remedies to all the animals of a large flock in which the disease prevails,

those sheep which show by their action that they are seriously affected should be caught and properly dressed with one of the lotions previously referred to, or with a solution of one ounce of tannic acid in eight ounces of glycerine. In extensive outbreaks of disease among sheep, the application of the necessary remedies to the feet may be much facilitated by arranging a shallow wooden trough in such a manner that it may be filled with the necessary lotion, and the sheep driven through it slowly, or kept standing in it for a few minutes. This method will obviate the necessity for catching the animals and dressing them separately, except in those cases where it is apparent from the severity of lameness that the feet have suffered important changes.

Pigs, as before stated, are affected very severely both in the feet and external part of the nose. In sows the vesicles appear over the whole surface of the integument covering the udder. For obvious reasons very little can be done to alleviate the severity of the affection in these animals. Forcible administration of medicine is, as a rule, out of the question, and the most that can be done is to keep the animals in a dry, well-ventilated, and sheltered position, and apply the local remedies which have been suggested to the feet and other parts which are affected.

The mortality among pigs from foot-and-mouth disease is much higher than among other animals, so that it is not uncommon to hear the malady described as a fatal disease in swine. Probably to a large extent this fatality is due to the intractable character of the animal, which induces neglect of early precautionary measures, and permits the disease to assume a severe type before it is even discovered.

Complications very frequently occur which necessitate important modifications in the plan of treatment, but it is doubtful if such cases can be properly called foot-and-mouth disease when the entire mass of blood becomes poisoned by retention and the multiplication of the disease-germs which should have been excreted; the ordinary phenomena of the affection are exchanged for those which indicate various forms of blood disease. Splenic apoplexy, pulmonary apoplexy, cerebral congestion, formation of abscess in the areolar tissues, ulceration and sloughing of tegumental appendages, prostration and death, are the result of the non-elimination of the virus, owing sometimes to defective action of the excreting organs, but more commonly to the unscientific and obstructive treatment to which the animal is subject when the disease first appears.

Little advantage would result to the unprofessional reader, if the treatment of the complication referred to were discussed, especially as the means at our command are generally inadequate to restore the normal state of the circulating fluid, when it has once become charged with effete products, which it necessarily carries all over the system, infecting the elements of every tissue, until molecular death is followed by entire cessation of all the organic functions.

Treatment of the sick beasts must be commenced long before this condition has been established, or the time and trouble will be expended in vain.

Measures of Prevention.

If stock-owners determined to eradicate foot-and-mouth disease, there is no doubt that the object would be attained; but it is entirely useless to expect, or to base any sanitary legislation on the expectation, that such a determination generally exists. A certain proportion of breeders and feeders might combine to carry out a system of prevention which promised to effect the eradication of the disease, but straightway a number of less considerate persons would take advantage of the freedom which the self-imposed restrictions on the other side would relatively afford them, to make extra profits, and thus the good intentions of the few would be frustrated. No measures which seriously interfere with trade are at all likely to be generally adopted, unless under very stern compulsion; and indeed experience proves that compulsory legislation in reference to the movement of diseased and infected animals has little chance of being effectually carried out unless the circumstances are such as to induce the persons concerned to insist upon obedience to the law.

In the case of cattle plague, which is the only rapidly fatal contagious disease of which we have any experience in this country, the knowledge of its destructive action induces stock-owners, with few exceptions, to assist in putting the law in force for its suppression. The other affections are either so slow in their progress as to suggest a hope of the sick animal's recovery, or they are benign in their character, and consequently excite no apprehension of loss from death of the animals attacked. Therefore, no serious determination is manifested in carrying out the regulations which have been imposed by the legislature; and the few who demand more

severe restrictions than those in force, rather intend them to be applied to their neighbours' herds than to their own. The majority practically deny the necessity for any restrictive measures in respect of foot-and-mouth disease; and even if they tacitly accept them, they indicate their appreciation of such measures by disregarding, in their own proceedings, the restrictions which are intended for the repression of the disease. In short, there is no instance of persons concerned in the cattle trade being so impressed with the importance of foot-and-mouth complaint as to admit the necessity for restrictions which will interfere with their business, and subject them to loss and inconvenience.

Recently we have been suffering from a panic owing to the extensive ravages of the affection, and it is quite probable that while the excitement continued owners of cattle would have endured the inconvenience arising from restrictions on the movement of cattle for a time; but any measure, to be effective, must be of universal application; and it is vain to expect that stock-owners, in perfectly healthy districts, would consent to suffer for the general benefit, unless they could be made to understand that the probable advantage would outweigh the certain loss; and it is precisely at this point that the argument in favour of dealing with foot-and-mouth disease by severe restrictive enactment fails.

Difference of opinion as to the origin of the disease and its mode of propagation interferes with the adoption by consent of any universal system of prevention. Those who contend that the malady arises spontaneously—and undoubtedly the number of those who hold this view has much increased of late years—and others who contend that the poison is in the atmosphere, would hardly submit with patience to vexatious regulations which they believe to be useless when directed against a disease which depends on non-cognizable causes. The success of the measures which have been employed to stamp out cattle-plague and sheep-pox is chiefly due to the universal recognition of their absolute necessity and fitness. No one whose opinion has any influence doubts the fact of these diseases being foreign to our soil, in which they have never maintained a continued hold; no one questions the possibility of eradicating them by the employment of certain severe measures which have never been known to fail when fairly applied; no one contemplates without alarm the idea of those affections becoming naturalised in this country; and therefore it is that all minor differences of opinion are merged in the common determination to get rid of the un-

welcome visitants at all costs. Nothing short of a firm conviction of the danger which is impending would suffice for the carrying out of the regulations which were applied to the malignant diseases cattle-plague and sheep-pox. That similar apprehensions are not generally felt in regard to foot-and-mouth disease is evident enough; and in their absence the only means which have proved effectual in controlling the spread of the affection will never be adopted.

In the opinion of many agriculturists, something less stringent than the cattle-plague regulations would be sufficient to rid us of foot-and-mouth complaint and pleuro-pneumonia; at best, however, it can only be said that the idea is unsupported by evidence—ten years' application of the cattle-plague restrictions over the whole country did not entirely exterminate either disease. Certainly, pleuro-pneumonia existed in the London dairies during the whole time, and in several instances cattle plague and lung-disease were combined in the same animal. Foot-and-mouth disease subsided to such proportions that it attracted no attention, and although cases of the disease were spoken of in different parts of the country, they were not thought worthy of special notice. The statement which has been so often made, that if any instances of foot-and-mouth disease had existed at the time immediately preceding the removal of the cattle-plague restrictions, they would have been recorded, is mere assumption. In the worst periods of its prevalence foot-and-mouth disease is barely noticed in veterinary and agricultural periodicals; and during the existence of cattle plague it excited even less attention than usual; indeed, the affection was not often referred to, unless in illustration of the effect on its progress which the establishment of cattle-plague restrictions had produced. That the results of these restrictive regulations have been very much over-estimated, recent inquiry has convinced me.

Writing on the subject of foot-and-mouth disease in 1869, I alluded to the decrease of the affection under the cattle-plague regulations in these terms:—

"From this time, 1863, it gradually declined until 1865, when it recurred in a very severe form immediately upon the outbreak of cattle plague, not unfrequently attacking the animals which were at the time suffering from that disease. Many of the cases of eczema which were examined in the autumn of 1865 presented remarkable lesions of the mouth, the abrasions of the membrane of the palate and cheeks being as extensive as they were in severe cases of plague.

"Hundreds of cattle affected with foot-and-mouth complaint were

seen in the beginning of 1866, but when the restrictions on cattle traffic were carried into effect with an increased stringency, as the cattle plague made incursions into new districts, mouth-and-foot disease and pleuro-pneumonia declined.

"For a period of six months during the summer and autumn of 1867 the disease was seldom seen; the cattle in the Metropolitan market and in the lair were free from the affection, and a like immunity from its attack was enjoyed by animals all over the country. Isolated cases might be met with, but it is certain that, at the time of cessation of the cattle plague, the live-stock of the United Kingdom were more entirely exempt from infectious disease than they had been for many years."

These remarks were written without any intention to prove that foot-and-mouth disease has been absolutely exterminated by the measures which had been used for the eradication of cattle plague. It was generally known at the time that the disease had subsided to a remarkable extent, and its absence from the lairs of the metropolitan market naturally attracted attention, but it was never suspected, and certainly it was not intended to suggest, that the malady had altogether ceased. On the contrary, it was known to exist among cattle in different parts of the country while the cattle-plague regulations were in force. These regulations, in reality, commenced to operate on March 24th, 1866, when foot-and-mouth complaint was very prevalent, but less so than in 1865. The Order of March 24th, 1866, provided that fairs and markets for sale or exhibition of cattle should be held only by licence, that foreign cattle should not be moved from the town or place in which they were landed, and cattle brought by sea from any part of the United Kingdom could not be moved from the town or place alive without a certificate of health, only to be granted after proper inspection.

Cattle could not be moved on a highway between sunrise and sunset; no movement of cattle was permitted on a highway, railroad, or river, without a licence; and even hides, and horns, or hoofs, were to be conveyed under strict supervision. These restrictions were continued, and even made more severe from time to time until June, 1868, when they were revoked in reference to all parts of the country excepting the metropolis, which was not set free until the opening of the Deptford Market in January, 1871.

It appears, therefore, that the cattle-plague regulations were in operation for more than twelve months, that is, from the spring of 1866 to the summer of 1867—before the decline of foot-and-mouth disease was so marked as to excite any

remark. Accidental reference to my notes of 1867 has just reminded me that, in the beginning of 1867, while the regulations were most rigidly enforced, I investigated an instance of foot-and-mouth disease at Thirsk of so virulent a kind that it was suspected to be cattle plague. One animal died about the time of my arrival, and an examination of the herd, which was entirely composed of Irish stores, showed that the disease had attacked nearly the whole of them, and was rapidly running its course, notwithstanding the extreme coldness of the season, and the presence of a deep snow in the pastures where the animals were placed.

Mr. Rayment, the Inspector of the Metropolitan Market, has just given me some extracts from his note-book in reference to the existence of foot-and-mouth disease in the market in 1867, observing, at the same time, that he only noticed instances of its unusual prevalence.

On January 10th many animals were found to be affected. March 14th another entry occurs, in which the state of the disease is indicated by the terms "rather prevalent." Again, on March 18th and on April 8th a similar entry occurs. On April 18th the record is, "Foot-and-mouth disease very prevalent." May 13th a similar entry. After which no more remarks occur until the latter part of the same year, when my attention was called by Mr. Rayment to the peculiar form which the disease had assumed among the cattle in the lairs. The lesions in the mouth were most severe, resembling those of cattle plague. For some months previously no cases of the disease had been recorded as having occurred in the market lairs, and if Mr. Rayment had not observed the unusual character of the diseased parts no special notice would have been taken of it then.

In the winter of 1867 the first cases of foot-and-mouth disease in the lairs of the Metropolitan Market were detected in English beasts; from that period attacks became gradually more numerous, even while the cattle-plague regulations were in force, and a still more rapid extension of the malady was observed when they were revoked in June, 1861. During 1869, 1870, 1871, and part of 1872, the disease raged with remarkable force, and did not subside until the autumn of 1872. And now at the end of the summer of 1873 it has attained a position as low as it ever reached during any period of the operation of the cattle-plague restrictions.

Even if it were admitted, however, for the purpose of argument, that cattle plague and foot-and-mouth disease were simultaneously extirpated by the action of the restrictions

which were in force, the fact remains that the result was gained by means which could only be justifiably used in the presence of such an emergency as an outbreak of cattle plague. On the other hand, if it be maintained that the foot-and-mouth disease survived the plague, and it is a matter of certainty that it did, it follows that even cattle-plague restrictions would not be absolutely effectual; and in any case there is nothing to justify the belief that less severe measures would succeed.

The presumption that legislation of a much less restrictive character may diminish the rate of progress of the disease without seriously interfering with the free movement of animals, has, in fact, been entirely negatived during the last three years, when foot-and-mouth disease has prevailed to a remarkable extent in the presence of restrictions quite as onerous as public opinion permitted and even too severe to enlist general sympathy, or ensure general compliance, yet no impression was made on the progress of the disease, chiefly, it is admitted, for the reason that the provisions were not enforced; nor could they be enforced. All that has ever been advanced in proof of the determination of the local authorities to carry them out is included in the statement of the number of convictions which had been obtained against persons who infringed them.

The plain truth of the matter is, people will not submit to restrictions directed against an evil which they do not recognise to be of sufficient importance to call for interference; and, plainly enough, stock-owners do not care enough about the prevention of foot-and-mouth disease to take the most simple and obvious precautions against it. The cry has always been, let us be secured from importation of foreign diseases, and then let us alone. In the mind of any unprejudiced inquirer no doubt can exist that this feeling is almost universal among farmers, a few breeders of pedigree stock alone being excepted.

No hesitation can be felt in admitting the reasonableness of the claim to be protected against the introduction of the disease from abroad; and the legislative restrictions on the foreign trade are based on a clear recognition of the claim. The measures which are enforced at all the ports where foreign animals are landed are excessively severe, and their operation has been so effectual, that for one outbreak which has been traced to the movement of infected foreign stock, a thousand outbreaks have been traced to the movement of diseased animals from one part of the United Kingdom to another; and such movement could not have been prevented

wihout producing positive stagnation in the cattle trade, which would have caused more injury than the unrestricted spread of the disease.

Restrictions on the importation of foreign animals are justifiable on the ground that they form a comparatively small proportion of our total supplies, and are only beneficial to us so long as they do no mischief; but the suggestion which has been often made to deal with Irish stock in the same way as foreign animals are dealt with is quite unpractical and never was seriously advanced. Ireland is our great source of supply of store stock, and whether the animals are healthy or diseased, we must have them. This fact is well known, and both in theory and in practice admitted. The prevalence of foot-and-mouth disease in Ireland recently did not in the slightest degree affect the price of Irish stock, nor lessen the demand for them in this country; and those who were loudest in their demands for stoppage of importation or the adoption of restrictions which would have amounted to the same thing, would have been the most appalled had their suggestion been accepted and acted on. The Irish cattle trade cannot be placed on the same footing as the foreign cattle trade, for the paramount reason that the circumstances are essentially different in the two cases. Foreign animals are in no way under our jurisdiction or control until they are landed on our shores; we cannot regulate their treatment in the countries whence they are exported, and therefore our only chance of safety lies in the establishment of severe restrictions, which shall deter the exporter from sending diseased stock, and protect us, as far as possible, from infection if diseased animals are landed. Regulations framed on this principle have been in force for some time past, and it is sufficient to say of them that they have been generally effectual in securing the object for which they were established.

In the United Kingdom we possess the power to apply sanitary regulations to our flocks and herds, and our aim shonld be to attack such an affection as foot-and-mouth disease in its centres; in fact, it should be the care of every stock-owner to deal with the malady in such a manner that the risk of propagation should be reduced to a minimum. Legislation on the subject may well be limited, as it now is, to those sections of the Act which provide that diseased animals shall not be exposed in public places or otherwise dealt with so as to inflict injury on healthy animals. Further than this, sanitary law, as respects foot-and-mouth disease, it would seem from our experience, cannot be successfully carried; and the actual

details of measures of prevention must be left to the energy of the individual who is most concerned, the stock-owner, directed by the veterinary surgeon. Two words, isolation and disinfection, taken in their extended sense, include all that can be said on the subject of prevention. The disease is not fatal, and therefore there is no justification for the adoption of the stamping-out system, as it is applied to cattle plague. Considerable loss is, however, inflicted on the grazier and the dairyman, and therefore it is important to employ all sanitary means to regulate the course of the disease, to moderate its severity, and to prevent its extension.

Veterinary science is quite competent to deal effectively with animal plagues, if stock-owners choose to avail themselves of its aid; but it is futile to anticipate any advantage from the adoption of a system of empirical treatment directed by uneducated men, whose chief idea is to cure the sick beast by antiquated nostrums; while the subtle infection is allowed to extend its area of operations unchecked. Sanitary regulations, many of them restrictive in their nature, are required in all cases of outbreaks of foot-and-mouth disease; but they must, to be effectual, be applied by the owner, or with his full concurrence.

Immediately on the discovery of the disease in a herd it becomes necessary to decide whether the attempt is to be made to limit the affection to the animals among which it first appears, or the disease is to be allowed to run its course. If the circumstances are such as to render the chances of escape of the stock on the farm very slight, direct communication of the contagion by simply introducing a little of the saliva of the sick animals into the mouths of the healthy ones on a tuft of hay is the most effectual way of getting quickly over the trouble, while the disease, thus induced, is almost certain to be mild in its character. This method of conveying the affection to all the animals which, in the natural course of things, are likely to be attacked, is far preferable to permitting the association of diseased with healthy animals, which will indeed be ultimately attended with the same result, attained, however, in an irregular manner, and at the expense of considerable time and anxiety.

On the other hand, if the affection be detected among newly purchased stock, or if it occur among fattening beasts or dairy cows, it is of the first importance to prevent its spread, by isolation of the sick animals, and the use of disinfectants; but even in these instances, if the affection shows an unmistakable tendency to extend, inoculation with the saliva is

to be recommended. Whatever course the stock-owner may determine to adopt in reference to the management of his own herd, the commonest consideration for the welfare of the stock in the neighbourhood will prompt him to give immediate notice of the outbreak on his farm to his neighbours, in order that they may protect their animals from infection as far as possible, and next, he will deem it a matter of duty, as well as to his own interest, to limit the disease to his own stock by strict attention to sanitary regulations. The premises on which the disease exists should be treated as an infected place by the occupier and his servants. Sick animals should be completely isolated, whether the disease has arisen naturally, or has been communicated intentionally in the manner suggested. All the secretions from such cattle should be disinfected or destroyed; milk from cows affected with the disease should be well boiled before it is given to pigs; all the manure and sweeping of the sheds should be mixed with quick-lime, and a solution of some disinfectant, as carbolic acid, one part to fifty of water, or common alum-water, may be used to wash the mouth, nostrils, udder, and feet of the sick animals, and thus destroy the virus at its sources.

When cattle are on the pastures it is difficult to apply these measures effectively, but even under such unfavorable conditions the disinfecting solutions may be employed to disinfect the manure in the field, and also may be applied to the parts of animals whence discharges issue by means of a syringe when close approach to the animals is not possible.

In this country it is not easy to compel the disinfection of the attendants on sick cattle, who do often more mischief than the animals themselves; but the farmer who is anxious to limit the spread of the malady should be alive to the importance of avoiding this source of danger if possible; and if, in carrying out the necessary precautions, he can, by exhortation or entreaty, cause the attendants to wash their hands in a little alum-water, and tread in some lime every time they leave the sick cattle, or the places in which they are kept, he will have the satisfaction of knowing that he has done good in more ways than one.

Active legislative measures in respect of foot-and-mouth disease will most probably in future be confined to regulating the movement of diseased animals on public roads, the careful watching of fairs and markets, the disinfection of pens and places in which diseased animals have been kept for sale or during transit, and the application of stringent

restrictions to imported animals. The management of the disease among home stock will, therefore, devolve on the farmer, who may, if he chooses, effect far more than ever could be done by oppressive enactments which cannot be enforced.

Agricultural Societies and Chambers of Agriculture might do good service by recommending, and, as far as their influence extends, ensuring the adoption of precautions against the introduction of foot-and-mouth disease, and the control of its extension where it has appeared.

First in importance among sanitary regulations is the separation of newly purchased stock from the stock on the farm for several days. Next, in the event of disease appearing, it should be a special object with the owner of the infected herd to confine the affection to his own premises, and then to decide whether he will endeavour to arrest its spread, or assist it by inoculation. Prevention is possible where facilities exist for isolation of sick animals, and the frequent and extensive use of disinfectants. In some instances where foot-and-mouth disease has appeared in cowsheds, the constant use of sawdust saturated with carbolic acid on the floor of the shed has been followed by the cessation of the disease after a few animals have been attacked, and there is no doubt that even the malignant cattle plague was kept in check in several instances by the constant employment of carbolic acid, although the animals succumbed as soon as they were removed from its protective influence.

Other agents may be equally efficacious when carbolic acid is objectionable. Chloride of zinc, chloride of lime, chlorine gas, sulphurous acid gas, are all valuable under different circumstances, and the list may be extended according to the experience of the person who has the sanitary charge of the district where the malady prevails. All the measures employed must be based on the principle of guarding against the introduction of disease by quarantine of newly purchased stock, and preventing its spread by isolation and disinfection, Every diseased animal must be treated as a manufactory of the specific poison, and every individual and substance which comes in contact with the animal as a probable medium of its extension.

The question will always return, is foot-and-mouth disease an affection of such a serious character as to render this degree of circumspection necessary or desirable? And the answer must be left to the agriculturists of the kingdom. If they decide that the object is worth the cost, there need be no difficulty in carrying out the regulations which have been suggested.

REPORT ON THE EPIZOOTIC INFLUENZA AMONG HORSES IN 1872—73.

THE Sanitary Committee respectfully submit the following report in compliance with the resolution of the Board of Health Department of the city of New York, passed on the 30th day of October, 1872:

Resolved: "That the Sanitary Committee be and is hereby requested to continue the investigation as to the nature of the disease now prevailing among horses; and that said committee report the result to this Board."

Epidemic diseases have afforded a fruitful subject for study and speculation in all periods of history. So sudden is their invasion, so wide-spread their devastation, and so little amenable is their progress to the laws governing other affections, that they have excited the interest and engaged the attention of the wisest and ablest students and philosophers. In the middle ages, the terrible epidemics which swept over Europe at uncertain periods were as surprising and unaccountable to physicians as were the comets to the astronomers. They speculated in vain in regard to their origin, their causes, and the laws which regulated their progress. The ultimate issue of all their investigations was that epidemics depended entirely upon subtile meteoric conditions quite beyond the possibility of human comprehension.

In modern times the remarkable revelations of the microscope in the fields of histology and pathology, as well as in the physical world generally, have created a new interest in the study of epidemiology. And this study has recently become of extraordinary importance from the discovery of living germs of animal and vegetable organisms in the fluids and tissues of persons sick of various epidemic diseases. At present, the course of investigation is towards the determination of the relation of these organisms to the causation and propagation of epidemics.

Epidemics and epizoötics are believed to be identical in their causation and methods of propagation. For this reason, epizoötics have latterly attracted great attention, owing to the facilities which they afford for applying the microscope to the examination of diseased structure and fluid in all stages of the affection. And it was with a view of adding, to the sum of knowledge which we now have of the nature of epizoötics, such additional facts as could be obtained, and

thereby throwing additional light on epidemics, that the Board of Health ordered the Sanitary Committee to investigate the recent epizoötic among horses.

The circumstances, however, under which the investigation was made were not favorable for that exhaustive study which was desirable. The epizoötic was already at its height when the study was commenced, and so rapidly did it disappear that there was not that time allowed for systematic clinical observation, careful pathological research, and experimental investigation, so much desired. Every effort was, however, made to use the means at the command of the committee, and in the following pages are embodied those results which are deemed worthy of permanent record.

In organising the work, the committee intrusted its supervision to Dr. A. B. Judson, Assistant City Sanitary Inspector, by whom a very careful history of the progress of the disease was prepared, with an illustrative chart, which appears in his report. Prof. Liautard, of the Veterinary College, who was called to the first cases which occurred in the city, and who had a large clinical experience, kindly gave his advice and assistance when requested, and has furnished a report of the disease as it appeared in New York. The microscopical examinations were made by Dr. Wm. E. Hall, Health Inspector, and the chemical investigations were conducted by Dr. H. Endemann, Assistant Chemist to the Board.

History of Equine Influenza.

The following historical notes, gleaned principally from Fleming's 'History of Animal Plagues,'[1] will be of interest in connection with the study of the epizoötic of 1872:

The first recorded epizoötic of influenza among horses, of which there is no reasonable doubt, is that which occurred in 1648. It is thus described by Fleming: "A. D. 1648, an epizoöty among the horses of the French army in Germany. Solleysel, a celebrated veterinarian and author, has given us a description of it. It began by fever, great prostration, and tears running from the eyes, and there was an abundant mucous discharge of a greenish colour from the nostrils. The horses experienced loss of appetite, and their ears were cold. Few of those attacked recovered. The treatment adopted was with a view to neutralize the malignity of the poison, and to fortify nature, 'for it was a poison,' says this

[1] 'Animal Plagues: their History, Nature, and Prevention.' By George Fleming, F.R.G.S., &c. London, 1871.

writer, 'which gave rise to the disorder and was the cause of the fever. Remedies, at the commencement of the epizoöty, were of no avail. Precautions were taken to have all the healthy horses removed from the infected stables, and they were not to return to them until they had been fumigated, whitewashed, and otherwise cleansed.' Solleysel designated it a 'fièvre pestilentielle,' very deadly at its commencement, but afterwards amenable to medical treatment. It was evidently 'the influenza.' A catarrhal fever had been epidemic the previous year."

The years 1688 and 1693 were both marked by epidemics of influenza, and epizoötics of influenza among horses, in Britain and on the Continent of Europe, according to Fleming, and also Dr. Theophilus Thompson ('Annals of Influenza,' London, 1852). In 1712 the horses of Europe were affected with epizoötic influenza, but the records collated by Fleming are very imperfect. It was not until the year 1727 that the records notice the erratic or invasive character of the disease. This peculiarity is noticed in 'A Chronological History of the Weather and Seasons; and of the Prevailing Diseases in Dublin,' by John Rutty, M.D., London, 1770. He says: "In November, in Staffordshire and Shropshire, their horses were suddenly seized with cough and weakness, disabling them from labour. In December, both in Dublin and the remote parts of the kingdom, the horses were seized with a cough and shortness of breath, and sometimes sore throat; some bled at the nose. A large discharge of thick phlegm from the nose, long continuing, was salutiferous. Some died in the streets, partly through the carelessness of their masters exercising them abroad, even during this disorder, partly through neglect of bleeding and purging, and partly from improper medicine." Here we have a disease, with whose features we are sufficiently familiar from recent observation, which in November was in interior counties of England, and in December was in Dublin and the remote parts of the kingdom.

In 1732 influenza swept over Europe and North America. Its effects on mankind and its progress from place to place are fully and carefully recorded. It was also epizoötic, as appears from the following extract from 'Medical Essays and Observations,' published by a Society in Edinburgh: "We believe it will not be improper here to mention the horses in and about this place being universally attacked with a running of the nose and coughs, toward the end of October and middle of November, before the appearance of this fever of cold among men."

The epizoötic of 1732 was observed in London by William Gibson, author of 'A New Treatise on the Diseases of Horses,' London, 1754. In Gibson's account we have as accurate a description of the events of the past year as of those occurring one hundred and forty years ago: "About the end of the year 1732 there was a very remarkable distemper among the horses in London and in several other parts of the kingdom. They were seized suddenly with a vehement dry, sounding cough, which shook them so violently that some of them were often ready to drop down with hard straining and want of breath. Their throats were raw and sore; many of them had their kernels (submaxillary glands) swelled, and were painful to the touch. For the first two days most of them refused all manner of food as well as water, and had so many other bad signs, that when this distemper first broke out many were afraid of a mortality coming among them; and, indeed, the only good sign they had was the vehemence of their cough, that both kept their blood in motion and speedily set them running at the nose, which generally began the third day, and continned in so profuse a manner for five or six days, that some of them in that time discharged as much as two or three pails would hold of purulent matter, which, however, was generally of a laudable colour and good consistence. While the running at the nose continued they would not feed much, though their appetites were craving, because the matter mingled so much with their food as to render it altogether disagreeable, so that they lost flesh exceedingly; but this loss of flesh proved a benefit to them rather than a detriment, and as soon as the running abated they ate voraciously and soon recovered their flesh. This distemper, though no ways mortal, yet was so very catching, that when any horse was seized with it, I observed those that stood on each hand of him were generally infected as soon as he began to run at the nose, in the same manner as the smallpox communicates the infection when they are upon the turn. While this sickness lasted, above a hundred of the troop of horse under my care were seized with it. I always caused the sick horses to be removed from the sound as soon as they were taken ill, and put by themselves, as in an hospital. And in one troop of horse grenadiers we filled a stable of thirty-six standings in three days; an infirmary of five standings, and another of eighteen standings, in three or four days more; nevertheless, all of them recovered in a short time."

In 1743 influenza prevailed as an epidemic in England, and a few doubtful words quoted both by Fleming and by

Dr. Thompson seem to indicate an epizoötic influenza among horses.

In 1750 an epizootic passed through Great Britain and Denmark, which resembled in all its features that of the last year in this country. Rutty says: "About the middle or latter end of December, the most epidemic and universally-spreading disease among horses, that any one living remembered, made its appearance in Dublin, which seems to have been nearly analogous to the influenza and catarrhal fever which seized mankind in the years 1737 and 1743, but now particularly attacked the horses in their turn, as may appear by a comparison of their respective histories. It had appeared in England in November, and spread through all England almost in an instant, and toward the end of the month began to abate. It raged in Denmark at the same time, but it did not reach our horses in Dublin till its decline in England at the time before mentioned, having probably been imported, and was nearly of the same duration here as in England; however, it affected the horses in Munster and Ulster almost if not quite as soon as in Dublin, and there was scarce an instance of a horse in town or country but had it." It seized the horses "like a violent cold, with heaviness, loss of appetite, cough, and laborious breathing, and then a profuse running at the nose and mouth of a digested, or thick, yellow, greenish matter, upon which they grew better. In England, as well as here, it did not prove very mortal, though some died of it."

In the epizoötic of 1750, *post-mortem* appearances, similar to those described in the present epizoötic in cases of purpura hæmorrhagica, were noted by an author named Osmer in 'A Treatise on the Diseases and Lameness of Horses,' London, 1766. His words are: "On many of these I made several incisions in the skin, on various parts of the body, and, wherever an incision was made, I found in all of them a quantity of extravasated serum lodged between the skin and the membranes."

In the year 1758 influenza was both epidemic and epizoötic in Great Britain. Dr. Robert Whytt, of Edinburgh, wrote: "A gentleman told me that in the Carse of Gowrie" (a large valley in Perthshire, Scotland), "in the month of September, before this disease was perceived, the horses were more than usually affected with a cold and a cough." And in regard to the same year Fleming writes: "Influenza appeared in Stirlingshire, and in the north of Scotland, in the months of September and October, and horses seem to have been affected 'with a cold and a cough'

at the onset of the attack in man. Vast numbers of horses died during this year in London and neighbourhood, from an epizoöty. Probably it was this 'influenza.'"

Two years later, in 1760, influenza was again epizoötic in Great Britain and in other portions of Europe. Fleming, referring to this year, writes: "At the same time an epizoöty manifested itself amongst horses, which affected, it is supposed, every animal in the locality" (Cleveland, county of York). ". . . It was prevalent and very fatal among horses in London in January, as the Chronicle of the Annual Register for that month says: 'A distemper which rages amongst the horses makes great havoc in and about town. Near 100 died in one week.'" Fleming also quotes from Rutty as follows: "Ophthalmia prevailed during the north-east winds in April, and an epizoöty among horses at the same time, of the nature of an epidemic catarrhal fever, which took its rise in the winter, and was also common to other parts of Europe. . . . It raged in London and other parts of England in January, February, and March, and seized our horses in Dublin at the end of March, moved westward as other epidemics frequently do, and on the 4th of April it was become general in this city, and continued till the end of that month. . . . The mules also received the infection."

The latter part of the year 1775 was marked in England by an epidemic of influenza. The historian of this epidemic, Dr. Fothergill, of London, with praiseworthy zeal, collected reports on the subject from all his medical brethren in England who were disposed to respond to his printed circular calling for information. These reports are to be found in Dr. Thompson's 'Annals of Influenza.' The disease prevailed from the middle of October to the middle of December, 1775, and it appears from the following extracts from the above-mentioned reports that influenza was epizoötic among horses in the preceding August and September. Dr. Fothergill, writing in London, says: "During this time, horses and dogs were much affected; those especially that were well kept. The horses had severe coughs, were hot, forbore eating, and were long in recovering." Dr. William Cumming, of Dorchester, writes: "After the middle of August, I have heard, from good authority, that a disorder among the horses prevailed very generally in Yorkshire." Dr. Thomas Glass, of Exeter, writes: "I have only to add that in this part of the country, in the month of September, many horses and dogs were severely afflicted with colds and coughs." Dr. Haygarth, of Chester, writes: "About August and Sep-

tember, in North Wales, almost all the horses were seized with coughs." Dr. R. Pulteney, of Blandford, writes: "I heard much of horses and dogs having been affected, before we heard of it among the human race."

The following quotation from Fleming's work refers to the year 1782: "An epizoöty of influenza appears to have prevailed in Europe at the same time as the epidemy in man. Huveman observed and reported upon it as it manifested itself in Germany, and Abilgaard, the talented founder of the Veterinary School at Copenhagen, has left an admirable monograph on this disease, which he had ample opportunity for studying during the period it affected the King of Denmark's stallions." This epizoötic did not make its appearance in England, or, if it did, we have found no record of it.

For the year 1789, Fleming writes: "Influenza was very severe in New York and Philadelphia, and over a large tract of that Continent; at the same time there was great mortality among the horses in Maryland."

In 1798 influenza was epizoötic among horses, as indicated in the following words, from the remarks made by Mr. Barlow, veterinary surgeon, before the Highland Agricultural Society, in 1853, and printed in the *Veterinarian* of that year: "A severe catarrhal affection among horses was observed and described by Mr. White, veterinary surgeon, of Exeter, and Mr. Wilkinson, veterinary surgeon, Newcastle-on-Tyne, in 1798. The symptoms exactly corresponded with those now constituting what is called influenza."

During the prevalence of epidemic influenza, in 1803, all kinds of domestic animals seem to have been affected with unusual diseases; but it is impossible, in the 'Annals of Influenza' (pp. 213—215), to find good evidence of epizoötic influenza among horses.

In Mr. Barlow's remarks, above quoted, occur the following statements in regard to influenza among horses: "It reappeared again among horses very extensively and severely in 1815 (Wilkinson on 'Catarrhal Affections in Horses,' Newcastle, 1818). John Field, of London, records the remarkable prevalence of the disease in 1819 and 1823. Since that time, and up to the present, we find many records of its occurrence in the *Veterinarian*. It is singular that, although of late years scarcely twelve consecutive months have passed without many cases having been observed, yet, at intervals of four years, influenza seems to give us a specially severe visitation. Thus, it is noticed by Wilkinson, in 1815; by Field, in 1819 and 1823; by Percival, in 1828, 1832, 1836, 1840, and 1844 (*Veterinarian*, 1845). Most of us remember it

well in 1848, and still better in 1852. Thus, excepting an interval of five years (between 1823 and 1828), we can trace its periods of aggravation in four-year cycles, from 1815 to the present time."

The following extracts present the evidences, contained in the *Veterinarian*, of the appearance of epizoötic influenza among horses in England from 1828 to the present time:

Mr. Samuel Brown writes, August, 1828: "I am of opinion that this epidemic was primarily an inflammation of the mucous membrane of the pharynx and larynx. It has attacked all ages—in the stable or at grass—situated on a hill or in a vale—drinking from stagnant pools or fresh water."

Mr. W. Percivall writes, April, 1832: "Whether we christen it (the prevalent fever) an epidemic or an influenza, or assign any other appellation to it, is of little moment. Now and then the disease has been ushered in by a shivering-fit, which I have known to last (off and on) for twenty-four hours. Severe cases exhibit catarrhal symptoms along with the above; a cough is a common concomitant; a discharge from the nose more commonly *supervenes* upon the primary disorder than commences with it. The most common of the sequelæ of the disorder is, swelling of the legs—the hind always, sometimes the fore too."

In a paper read, November 22nd, by President Sewell, of the Veterinary Medical Association, on 'The Present Epidemic,' he says: "Local circumstances seemed to have little to do with it. It went through the best-regulated and best-ventilated stable almost as completely as that which was most neglected."

Mr. Harrison, of Lancaster, writes, in 1837: "All ages, from a foal of a month old, to very old horses, have indiscriminately been subjected to its attacks."

Prof. Stewart, of Glasgow, writes: "In November, December, and January, the disease raged to an unexampled extent. It suddenly invaded stables in all parts of the town; and, wherever it appeared, it generally spread over the whole stud."

Mr. W. Percivall writes: "That its production is connected with atmospheric causes seems most probable, from the circumstance of its being found to prevail so extensively and generally at the same season, and in all localities—in the centre of London and upon the Surrey Hills—to present one uniform aspect."

In February, 1841, W. Wotton, of Tiverton, writes: "In fact, carriage-horses, hacks, farm-horses, and colts, have suffered indiscriminately. . . . The early symptoms are loss of appetite; soreness and increased heat of legs; a

defluxion from the eyes, the lids of which become rapidly swollen, so much so that in many cases the serous deposit actually forces up and inverts the conjunctivæ; drooping of the head; difficult respiration, with evident obstruction of the frontal sinuses; great œdema of the legs; a small, tremulous pulse; an unwillingness to move; and the position in standing is very similar to a horse in tetanus."

From letters, printed in the 'Proceedings of the Veterinary Medical Association,' at its fifth session, it seems that the disease appeared at Southampton during the month of September; at Newcastle-under-Lyme, Staffordshire, "about the middle of last September;" and at Rochdale, Lancaster, "about the end of last September." From these facts it is apparent that the course of the disease was from the south toward the north.

"In 1849 there was an unusual prevalence of influenza among horses in London and the provinces; but it is not clear that it was strictly epizoötic.

In January, 1865, under 'Facts and Observations,' occurs the following statement: "*Influenza among Horses.*—For the past month this disease has assumed a very severe form among the horses in the metropolis, and many deaths have occurred. . . . Nor has the malady been confined to London, or its immediate neighbourhood, but has proved equally as rife and even more fatal in many parts of the country." W. Ernes, M.R.C.V.S., of London, writes in February as follows, in an article 'On Influenza among Horses in the Metropolis': "It attacks all horses indiscriminately; but those only who are hard-worked, though well-fed, have suffered most." Thomas Graves, M.R.C.V.S., of Manchester, writes in March as follows, in an article entitled 'Thoughts in the Sick-Box—Influenza': "This disease has been very prevalent lately in many of the large towns and cities of England, and in some places it has been attended with great fatality."

Since the year 1865 we find no evidences that London and the English provinces have suffered from influenza as an epizoötic.

The details of the history of the influenza of 1872, as it spread from its origin in Canada throughout the United States, were carefully collected by Dr. Judson as the epidemic advanced, and may be regarded as entirely reliable. This history forms a most interesting feature of the report, as it enables us to estimate the rapidity of its progress, and determine, at least approximately, the method of conveyance.

(*To be continued.*)

HASSE ON TRANSFUSION OF LAMB'S BLOOD INTO MAN.

Dr. Hasse, of Naudhausen, relates in the first part of a valuable and very interesting monograph, sixteen cases of mediate transfusion of venous defibrinated human blood, performed by himself during the years 1869-72. In the second part, he describes fifteen cases where he performed immediate transfusion from the carotid artery of the lamb to the vein of the patient during 1872 and 1873. The third part gives an account of his method of performing both mediate and immediate transfusion.

The first series of Dr. Hasse's cases show four cases with good results (phthisis, two cases of chlorosis. and one of marasmus of a child); ten cases with temporary improvement, but with death following at last (five cases of phthisis, one of pyæmia, one of amyloid degeneration, one of marasmus after dysentery, one of marasmus after enteritis, one after scarlet fever); and two cases where little or no improvement followed, but which did not die (anæmia following abortion and uterine disease). Cases of immediate death after the operation did not occur.

The second series contains fifteen cases where lamb's blood was injected by the immediate method. There are eleven cases of good, even surprising results (six cases of phthisis, one of anæmia after enteritis in a child, one of anæmia after placenta prævia, two of anæmia after puerperal disease, one of chlorosis); three cases where the improvement was only slow and less perceptible or temporary (one case of caries of the spine, one case of anæmia resulting from pneumonia and dysentery, and one of cancer of the stomach); and one case of tabes dorsalis, where death occurred four hours after the operation, with a rise of the temperature to 109° Fahr.

Respecting this one case of unhappy result, Dr. Hasse believes that in consequence of the severe disease of the nervous centres, transfusion would better have been avoided, but that the lamb's blood itself was not the cause of death. The success was most brilliant in those eleven cases of almost otherwise incurable diseases where the operation really saved the lives of these patients; and it seems that we have now in transfusion a very valuable means of treating of consumption, even in desperate stages. The general state of these patients soon improved, as well as the local symptoms.

Dr. Hasse thinks that the use of lamb's blood is preferable

to that of defibrinated human blood, not only because danger to the blood-donor is avoided, but also because the effect of lamb's blood on the disease is more powerful and permanent. He lets pass over as much blood as the patient can bear, viz. till certain symptoms appear, which regularly follow this kind of transfusion.

During the first twenty to thirty seconds the patient has a warm feeling running up the arm. The veins begin to swell, the skin of the arms and the chest become red, and some perspiration may be seen on the face. Then dyspnœa sets in, and is followed by a feeling of fulness of the abdomen. Sometimes, sickness and an irresistible tendency to go to stool are observed. At last headache, giddiness, and fainting take place. All the patients complained of pain in the back, which lasted sometimes several hours, but sometimes disappeared very soon. In a time varying from ten minutes to an hour after the operation, shivering sets in, with a rise of temperature for several degrees. This is generally followed by perspiration and a sound sleep, from which the patient awakes in greater strength. In several cases the urine on the following morning contained albumen and hæmatin, which disappeared the same day; but he never found any blood-corpuscles. Some days later, in most cases, there was an eruption of urticaria.

The mode of operating employed by Dr. Hasse is simply as follows. He exposes the carotid artery of a lamb for four or five centimètres (about $1\frac{1}{2}$ to 2 inches), puts a ligature round the vessel at the peripheral end, and inserts into the central part of it a glass tube filled with a solution of bicarbonate of soda, and fitted with an india-rubber tube from five to six centimètres long. Then he inserts a glass tube, also filled with the solution, into the vein of the patient. He draws off the india-rubber from the patient's tube, and, having seen that the stream of the blood passes well from the lamb, connects the two glass tubes with the india-rubber fitted to the lamb's cannula. Now transfusion is going on, and the proceeding is continued until the above-named symptoms show themselves, and till the oppression and dyspnœa indicate that the operatiou should be interrupted. He then applies two ligatures to the vein and cuts it, dressing the wound in an ordinary surgical way. He has never seen phlebitis after this mode of operating.

[From a private letter of Dr. Hasse, we know that he has enlarged the number of cases where he performed transfusion from a lamb since, and we can only congratulate him for having with such energy and success promoted this highly

interesting object, in spite of the many difficulties of practice in a provincial town.]—*Rep.* P. Schliep, M.D., Berlin.—*The London Medical Record.*

Analysis of Continental Journals.

By G. Fleming, M.R.C.V.S., Royal Engineers.

EXPERIMENTS WITH THE SCOLEX OF TÆNIA MEDIOCANELLATA.

Professor Saint-Cyr, of the Lyons Veterinary School, in a note communicated to the Academy of Sciences, on August 25th, 1873, details the results obtained from the administration of the protoglottides of the *Tænia mediocanellata* to calves, the experiments being repetitions of those first inaugurated by Leuckart and Mosler, and afterwards by Cobbold and Simonds. After stating that there are three cestoid worms which may inhabit the intestine of man—the *Tænia solium*, whose larva is the *Cysticercus cellulosus* of the pig; the *Bothriocephalus latus*, whose scolex, according to Bertolus, of Lyons, and Knock, of St. Petersburg, exists in fishes belonging to the genus *Salmo*, and the *Tænia mediocanellata*, for a long time confounded with the *Tænia solium*, but which was definitively distinguished from it by Küchenmeister in 1853, Saint-Cyr remarks that the history of this entozoon is much less complete than that of its congener—the *Tænia solium*. He alludes to Leuckart's feeding calves with the ova of the *Tænia mediocanellata* and the effects produced; but is evidently not aware of the investigations of Mosler, nor the very remarkable results obtained at the Royal Veterinary College, and which were published in the 'Veterinarian' for 1865 (p. 513) and the 'Proceedings of the Royal Society' for the same year. The protoglottides were obtained from a young veterinary student at the school, who had served as a "Mobile" in the army during the Franco-German war, and who, after taking an anthelmintic, expelled a tape-worm nearly thirty feet long, formed of very long, wide, and thick segments, and with the head completely unarmed. Saint-Cyr recognised the worm, and put a large number of ripe proglottides to one side to give to a calf when convenient. Unfortunately the greater part of these were thrown away by a

servant; so that only four were given to a calf of the Charleroi breed, six weeks old, in good condition, and still at the teat. They were administered on June 27th, and soon after there were developed beneath the tongue, near the frænum, two small submucous tumours, indolent and hard to the touch, and quite like those found in the same region in measly pigs.

This calf was not killed until 224 days after the ingestion of the proglottides, the animal having been allowed to live for so long a period in order, as Saint-Cyr states, that the Cysticerci might attain their full development. The autopsy showed, however, that he had made a miscalculation. In addition to the two sublingual tumours, nine others of a similar kind were found in the walls of the heart, but none were discovered elsewhere. These tumours were constituted by Cysticerci, but the latter were dead, and the majority of them in such a state of advanced cretification that it was impossible to arrive at any very accurate conclusion with regard to them, except that no hooklets were observed.

On April 2nd the Professor had an opportunity of repeating the experiment. A certain number of detached proglottides and segments yet adherent, but mature, in all about forty, derived from the *Tænia mediocanellata*, were administered to a calf four weeks old, which was exclusively fed on milk. On April 21st there was observed on the inferior face of the tongue, near the frænum, a submucous granulation possessing all the characters of the *grain ladrique* (cyst of pork measle), though, of course, much smaller; this granulation increased a little in size until May 20th, the day on which the calf was killed, and fifty-four days after the ingestion of the proglottides. On examination of the carcase, twenty perfectly distinct Cysticerci were found disseminated here and there in the connective tissue; two beneath the lingual mucous membrane, six along the œsophagus in its cervical portion, and the others in the subperitoneal connective tissue. The parasite, when contained in its cyst of connective tissue, was about the size of a small cherry; deprived of its covering, which was dense and resisting, it had only the volume of a little pea or the kernel of a cherry stone. In shape it was regularly spherical, and not oval like that of the Cysticercus cellulosus of the pig. It was formed by a very fine, transparent, proper membrane containing a very limpid fluid; on one of the points of this was a small opaque white spot perforated by a minute opening, where the head was fixed and invaginated in the vesicle. The following were its characters: the head tetragonal, and almost quadrangularly

truncated at its anterior part; complete absence of rostellum and hooklets; four regularly circular, thick, and almost terminal suckers; greatest width of the head, 1·20 millimètre; diameter of the entire vesicle, 3 millimètres.

After noticing the characters which distinguish this bovine Cysticercus from that of the pig, Saint-Cyr remarks that the results of the two experiments show that the former is less numerously developed, and lives for a much shorter period, than the latter. Now, with regard to the number developed, this will depend upon the quantity of proglottides administered, their maturity, and their state of preservation. Saint-Cyr gave the calves a very small dose indeed, the first animal only receiving four and the second forty, with the result that in the former eleven cysts were found and in the latter twenty. Cobbold and Simonds, in their experiment, administered to the same calf first 80 mature proglottides, and in five weeks afterwards 200 more, though one half of these had been previously immersed in a weak alcoholic solution. The symptoms produced by this parasite-planting were very marked, and caused serious, almost fatal, disturbance, particularly after the second feeding. So successful had been the transformation of the ova into larvæ, that it was calculated that no less than 8000 measles were present in the carcase of the calf, no fewer than 130 vesicles being counted on the surface of a single muscle. In Mosler and Leuckart's experiments, of the three animals two died, and one, though very ill, survived.

An interesting feature in Saint-Cyr's experiments is the approximate determination of the existence of the Cysticerci in the body of its host. In the first calf, at the end of 224 days (or about seven and a half months), not only were they dead, but they had undergone calcareous degeneration to such an extent as to be almost undistinguishable. In the second calf, however, they were fully developed, and, it is to be presumed, alive at the end of two months. It is therefore not improbable that their existence is brief after they have attained their full larval development, and it is not at all unlikely that in from four to six months they have so far degenerated as to be incompetent to undergo their final metamorphosis when transferred to the human intestine.

Another noteworthy circumstance is connected with the Lyons professor observing the lingual cysts during the life of the calves—in one case in nineteen days after the ingestion of the ova. Considering the very minimum quantity administered, and the trifling amount of infection that resulted, it is curious to find these appearing in both calves in this

situation. In the London Veterinary College calf, they do not appear to have been seen during life, and on examination after death only "a few were remarked in the substance of the genio-hyoideus and other muscles belonging to the tongue, but the lingual organ properly so called appeared to be entirely free." Saint-Cyr was doubtless led to inspect the floor of the mouth soon after the animal had received the ova, from its having been noted for centuries in France that the *Cysticercus cellulosus*, when present in the pig, favours that part; indeed, from a very early period there were men in that country who made it their business to examine pigs for measles, and this was one of the principal regions to be inspected. During the reign of Louis XIV, so common was the disease, and so much was it dreaded, that men were appointed as *Conseillers du Roy*, whose special function was to examine the tongue of pigs sent to market, in order to discover if they were infected with the parasite, when, if they chanced to be so, they were condemned as unfit for food. From this vocation they were generally designated *Jurés langueyeurs de porcs*. These *langueyeurs* haunt the pig markets in France to this day, but not in any official capacity, and are noted for their expertness in manipulating the pig whose tongue they are called upon to examine. They seize the animal very adroitly by the left fore-leg, and by a knee push at the right flank, it is thrown on its near side, and kept there by a knee placed on its uppermost shoulder; a stick, which the inspector always carries, is then introduced between the jaws, which it widely separates, and maintains in that state by being held firmly under the arm at one end, the other being fixed on the ground. With the right hand, which is entirely free, they pull out the pig's tongue, look at it carefully, and pass the fingers along those parts where the cysts are usually found, in order to assure themselves whether they are present or not. This visual and digital inspection of course cannot always be relied upon; but the allusion, or rather digression, has been provoked by Saint-Cyr witnessing the cysts here as the first indication that his experiments had proved succcssful.

While on the subject of parasitism, it may be mentioned that continental veterinarians have for years given it their closest attention; and the literature of the subject, so far as the domesticated animals are concerned, is very extensive and complete. Clinically and experimentally, no opportunity appears to have been omitted of extending a knowledge of this interesting and important department of veterinary science. Some have even gone beyond the

domesticated animals, and experimented upon their own species. Professor Nicklas, of the Munich Veterinary School, for instance, administered the proglottides of the *Tænia solium* to the students and produced that tapeworm in them, thus further corroborating the result obtained by Küchenmeister' scelebrated experiment.

It may be noted that Professor Röll, of the Vienna Veterinary Institute, has on several occasions given the proglottides of the *Tænia mediocanellata* to pigs, but was not successful in developing the cysticercus in them.

PARASITIC DISEASE IN A CHICKEN.

Tripier and Arloing, professors of anatomy and physiology at the Toulouse Veterinary School, direct attention to a parasitic disease in a chicken, which was transmissible to others of the same species through the digestive organs, and which had, *apparently*, the greatest analogy to tuberculosis. The first fact was observed on December 19th, 1871, when the internal organs of a chicken were sent to Arloing by M. Larroque, a teacher at the same school. The liver was studded with a prodigious number of yellowish granulations the size of a grain of millet, and four tumours as large as a nut were fixed on the small intestine and cæcum; while another, the volume of a small egg, was attached to the origin of the latter. These tumours contained a thick cheesy matter, which, on a microscopical examination, led Arloing and Tripier to fancy it was a case of tuberculosis or leucæmia, and to try experiments as to its transmissibility through the medium of the digestive organs. On December 20th, a well-conditioned cock received one half of the matter, and was carefully kept for seventy-five days, when it was killed. At this time it had lost condition. On examining the body, there were observed on the surface, as well as in the substance of the liver, whitish granulations collected in rows, and which appeared to be formed by a network, the meshes of which were filled by minute specks of a carmine tint. This lesion demonstrated that the inoculation had been successful. But what was the nature of the malady thus produced by inoculation? Chance permitted Larroque to furnish another chicken to Arloing, which enabled him to continue this interesting study. The chicken, at the last gasp when sent to Arloing, was extremely emaciated. When it was examined after death, in addition to intestinal lesions identical with those noticed in the first chicken, there were caseous masses in the right lung, hypertrophy of the liver

with yellowish streaks, and numerous granules in the œsophageal mucous membrane and intermuscular connective tissue. The experiment of transmission was again made as before, on May 7th; and when the communication was made to the *Association Française pour l'Avancement des Sciences* in August it was still alive, but it had lost 100 grammes (nearly four ounces) of its initial weight. Balbiani, whom Tripier and Arloing consulted as to the nature of the lesions observed in the last chicken, had no hesitation in pronouncing them to be of parasitic origin. According to this authority, all the tumours were composed entirely of parasites having the greatest resemblance to those which Eimer had observed in mice, and which he described by the name of *Gregaria falciformis*. The portions examined by Balbiani exhibited the majority of the forms and phases of evolution of the gregarinæ, such as they are represented in Eimer's memoir. And indeed Arloing and Tripier, in pursuing their researches in the œsophagus and intestine of the chicken, the tumours from which had been examined by Balbiani, met with a parasite whose transformation they were able to trace from its free condition to its encystment. It presented itself in the form of a flat, oval, and rather elongated cell containing a granular matter and a transparent central nucleus. A kind of proboscis or sucker was noticed at the end which had the largest diameter. On perpendicular sections of the œsophageal walls, these observers could see the parasites in rows of from three to six or more, passing through the epithelium. On arriving in the subepithelial connective tissue, and sometimes also in the deeper layers of the epithelium, these rows became dispersed, and then each isolated parasite underwent a series of transformations which must have terminated in the more developed condition of the adult entozoon. In this way the oval outline diminished, the nucleus disappeared, and the contents, which had become more obscured, gradually separated from the envelope at the largest end. At the same time the envelope became thickened and fibrous-looking; the contents increased in proportion, and at the point where the latter had separated from the wall appeared small, round, very refractive bodies, which could be deeply stained by carmine. These were very probably the more immature forms of the parasite, which might afterwards wander throughout the body. With regard to the old cysts in the œsophagus, their contents became transparent, the granules finer and the walls retracted, and they resembled the rounded masses in the lungs and liver, and the intestinal masses.

Without committing themselves to an opinion as to the

nature of the entozoon, the two experimenters give the following conclusions :—

1. The communication now made has reference to a parasitic disease of chickens which has not hitherto, they think, been described.

2. This disease, by its localisation almost entirely in the viscera, and by the form of its lesions, bears the greatest resemblance to tuberculosis, and even to leucæmia.

3. It is transmissible by the digestive organs to creatures of the same species.

NEW VARIETY OF SPIROPTERA IN POULTRY.

Casali, in the 'Annuario della Società dei Naturalisti di Modena' (anno vii, fasc. 1, 1874), resumes the description of a nematode worm discovered in poultry, and gives drawings of it. The following are its principal characters : —

It is a thread-like, rather long, elastic worm, of a dull white colour. The male measures from 5 to 7 millimètres, and the female 11 millimètres. In the male the caudal extremity makes two and a half spiral turns ; in the female it assumes the form of a hook. The head of the female is generally obtuse, but that of the male is elongated and acute. The mouth, probably linear and fissure-shaped, bears two lateral and opposite prominences or conical chitinised teeth, and its opening represents a kind of rectangle, on the larger sides of which are collected at the upper extremities two pairs of organs, one on each side. These organs are filiform, contorted, and perforated by a canal which is a cæcum at the base, and directed towards the head in various twists, usually three ; the superior extremity is irregularly elliptical, and slightly harder than the other portion, bearing a very small aperture in the centre. Each tube has a diameter of about 000,003 mm., they offer in their interior a somewhat regular spiral line ; they apparently aid the parasite in its movements in the tissues.

The description of the digestive and generative apparatus next follows.

The female is ovovivaparous, the ova being oval, and varying in size from 000,005 to 000,003 mm. The embryos were witnessed in every stage of development in the worm.

Nothing positive could be ascertained as to its phases of development, though the author suspected that the young spiroptera represented a transitory form.

The pathological alterations the entozoon induced in the

poultry are carefully described. The proventriculus, or glandular stomach, as well as the muscular stomach, were involved, the latter for two thirds of its extent; in addition to being thickened in their parietes, the mucous membrane at the bottom of the peptic glands was perforated with galleries in the form of the section of a circle, either parallel with, or perpendicular to, the muscular tunic; these galleries lay beside each other, and each contained three or four spiroptera, male and female. The liver was twice its normal size; external to its capsule was found a tumour the size of a filbert, which on examination was found to be a cyst filled with coagulated fibrine of old date, and undergoing fatty degeneration. The cyst, which at first sight appeared to be single, was discovered to contain another, about the size of a pea, also containing fibrine. This cyst was considered as hæmitic, and did not appear to be related in any way to the presence of the spiroptera.

The fowl was in a state of inanition; which is not to be wondered at, considering that so many of the peptic glands were invaded by the entozoon, the few remaining free from its ravages not being sufficient to furnish the quantity of gastric juice necessary for perfect digestion.—*Gazetta Medico-Veterinaria*, 1874, p. 76.

HIPPOPHAGY.

According to the *Abeille Médicale*, there were sold for food in Paris, during the third quarter of 1867, 418 horses, 7 asses, and 10 mules. During the third quarter of some of the succeeding years, the number was as follows:—In 1869, 599 horses, 27 asses, no mules; in 1871, 624 horses, 82 asses, 10 mules; in 1873, 1548 horses, 140 asses, 15 mules, which have furnished 303,971 kilogrammes of meat, not including the heart, liver, tongue, &c., which were utilised as with the ox. It will be seen that there is a notable increase in the demand for the flesh of solipeds. It also appears that there are in Paris forty horse butcheries, which are inspected by veterinary surgeons appointed by the administration. The price of the meat is about one half that of the ox, and horses which were previously sold for thirty to fifty francs are now fetching, on an average, from 130 to 150 francs. The animals benefit by this movement no less than the poor people who buy the meat; for whereas, before, the solipeds were worked as long as possible on a minimum allowance of food, and cruelly treated, the owners and knackers find it to their advantage to treat them liberally and feed them well. In order to encourage the butchers and others in this respect,

a horse-flesh committee has been formed, which awards medals to those who distinguish themselves. At its meeting on November 21st, 1873, it conferred one of these medals on M. Tétard, who has opened four shops, established a special slaughter-house, and built two good stables, with the object of popularising the consumption of this food.

In the French provincial towns, as at Rheims, Sedan, Lyons, &c., there is also a notable increase in the quantity of horse-flesh utilised by the poorer classes.

It is much to be regretted that a senseless prejudice still prevails in this country, even among the starving section of the population, against the use of this aliment. Humanity to man and beast would gain much by its introduction as an article of diet; and when it is known that there is less danger in consuming the flesh of a horse than that of an ox, and that it is equally nutritious, surely groundless prejudices might be successfully combated.

A KING'S TRIBUTE TO A VETERINARY PROFESSOR'S WORTH.

The lamented Belgian veterinarian and *littérateur*, Verheyen, in proposing subscriptions for a statue to Bourgelat so long ago as 1847, draws attention to the fact that King Maximilian-Joseph, of Bavaria, erected a monument to the memory of Professor Will, in acknowledgment of services rendered to that country, and caused the following inscription to be engraved upon it:

MAXIMILIAN-JOSEPH, King of Bavaria, &c., &c.,
Honours, By this Monument, the Services
of the Bavarian Medical Councillor
Doctor Will.
Services rendered in his rank of First Rational Veterinary Surgeon
in Bavaria, and of First Professor
of the Central Veterinary School at Munich.
He opened it the 1st May MDCCXC, and directed it to the Satisfaction
of his King and Country.
He died September 12, MDCCCXXI, in the LXV year of his active life.

DEATH OF A VETERINARY SURGEON FROM GLANDERS.

A veterinary surgeon in the French army, M. Nicouleau, has recently perished from acute glanders, the result of inoculation while dissecting the carcase of a horse which was affected with that disease. The submaxillary lymphatic glands of the animal were enlarged, the characteristic nasal discharge and ulceration were present, but the unfortunate

gentleman could not find the distinctive tubercles in the pulmonary tissue, notwithstanding the most careful search.

THE CENTENARY OF THE COPENHAGEN VETERINARY SCHOOL.

On the occasion of the hundredth anniversary of the foundation of the National Veterinary School at Copenhagen, Professors Stockfleth, Prosch, and Freuchen were appointed Chevaliers, and Professors Jessen, of Dorpat, and Hering, Director of the Stuttgart Veterinary School, Commanders of the Second Class of the Order of Dannebrog. On the same occasion the Veterinarian and Councillor of State, Bendz, received the distinctive cross of the Dannebrog conferred upon citizens.

(*To be continued.*)

ROYAL COLLEGE OF VETERINARY SURGEONS.

REPORT OF PROCEEDINGS AT THE QUARTERLY MEETING OF COUNCIL, HELD ON THE 8TH APRIL, 1874.

PRESENT.—The President; Professors Simonds, Pritchard, and Assistant-Professor Axe; Messrs. Fleming, Moon, J. C. Broad, Withers, Woodger, Greaves, Lowe, J. R. Cox, Balls, Burrell, Dray, Hunt, Harpley, Naylor, Gowing, Moore, Cartledge, Cowie, and the Secretary.

The Secretary read the notice convening the meeting.

The minutes of last meeting were read and approved.

Letters were read from—

Mr. Wm. Field, regretting his inability to attend the meeting on account of ill-health;

Mrs. Silvester, desiring to convey to the President and Council her grateful thanks for the sympathy expressed by them on the occasion of the lamented death of her husband;

Mr. J. R. Cox, acknowledging the honour of his election as a member of the Council.

Letters were also received from the several members of the Board of Examiners approving the arrangements made for the April examinations in London.

Letter from Mr. George Fleming, calling attention to Mr. Lopes's having given notice to bring in a bill to amend the Juries' Act.

Mr. Cartledge asked if any communication had taken place with the solicitors on the subject.

Mr. Harpley said that he, along with the M.P. for Berwick,

went down to the House of Commons, and the latter saw Mr. Hart Dyke, who promised to see Col. Barttelot and Mr. Lopes on the subject, and that, as soon as the Easter recess was over, the Council would receive a communication on the subject of the Juries' Bill.

The Secretary announced the presentation of the following works to the library:

'The Specific Action of Drugs,' by Messrs. Burness and Mavor;

Dr. Cobbold's work on 'Internal Parasites;' by the author;

'New Veterinary Pharmacopœia,' by Prof. Tuson;

'Horses and Stables,' by Col. Fitzwygram, by Mr. Fleming;

It was proposed by *Mr. Broad*, seconded by *Mr. Gowing*, and carried unanimously—"That a vote of thanks be accorded to the several donors."

Letter received from Dr. Dunsmure enclosing receipt for cheque for £19 6*s.* 10*d.*, and expressing his regret that Mr. Williams' students were not permitted to come up for examination under "the old system" in April; also

Another letter, dated March 11th, referring to the examinations in April.

The Secretary intimated that the letter had been duly answered.

Letter from Professor Williams, dated 14th January, wishing to be informed whether there will be any more examinations under the old system, or whether the Council have power to suspend the bye-laws in favour of the students who entered the College before the new regulations came into force.

The Secretary said that Professor Williams was informed of the resolution that had been passed at the last quarterly meeting, to the effect that the examinations under the old system had ceased.

Letter read from Professor Williams in reply, dated January 20th, in which he gave it as his opinion that high legal authority was against any law that was retrospective or calculated to damage either the one or the other of the contracting parties; the students maintained that they entered the College with the understanding that they were to receive an examination at the end of a certain period, and finding they could not now do so, they very justly complained that they were hardly dealt with, and expressed a hope that the Council would see fit to yield upon the point, and thus save much annoyance and do away with a great deal of bad feeling which already prevailed, especially in Scotland.

Letter from Mr. Robert J. Bell, dated January 15th, enclosing petition from fifteen students of the New Veterinary College, Edinburgh, requesting the same to be laid before the Council. The petition stated that the students entered upon the study of their profession in 1872 under the rules then existing, and that they did not recognise the new alterations, which they considered amounted to a breach of contract.

Letter from Mr. Rothwell, student at Clyde Street Veterinary College, enclosing petition from twenty-seven students of that college, asking same to be laid before the Council. The petitioners complained of the unfairness of certain bye-laws affecting the examination for their diploma; and asserted that many students would be prevented from going up for their final examination, some would be put to aggravating inconvenience, while others would have to abandon the profession altogether, after spending their hard-earned savings or their friends' money and one or two of the best years of their lives.

The Chairman asked whether some of those students had not been examined.

The Secretary said that of those who had signed the petition, Alexander A. F. Simpson was a rejected candidate; Mr. Hugh O'Connor passed his first examination, and had already been before the Board; Mr. William Gladstone, Mr. Flower, Mr. Corbett, and Mr. Barker, passed their first examination; while Mr. Rothwell, who sent the petition, was a rejected candidate.

Letter from Mr. Darwell, Veterinary College, Clyde Street, Edinburgh, asking whether a student who had entered under the old rules could enter for examination in April next, and could enter for his first and second examinations successively.

The Secretary said he had been written to and informed that, as the old system had been abolished, the students would have to abide by the new rules.

Letter from Mr. Dobson, Veterinary College, Edinburgh, complaining of the new regulations; he received a reply to the same effect.

Letter from W. A. Taylor, President of the Lancashire Veterinary Medical Association, complaining also of the injustice of the new regulations, and asking the Council to reconsider their decision.

Letter from Mr. George Morgan, President of the Liverpool Veterinary Society, asking that an exception should be made in the case of students who had entered the College

previous to the passing of the new bye-laws, and asking that all memorials on the subject, from whatever college presented, be granted.

Letter from Mr. Cunningham, of Edinburgh, of the Scottish Metropolitan Veterinary Medical Society, to the same effect.

The Chairman said that these letters and memorials were a repetition of what had been laid before the Council at their last meeting, in reference to the subject of the alteration of time for the examinations. In order to send an answer to the several applications it would be necessary for a resolution to be passed.

Mr. Moore considered it was a great hardship for the students. He thought that those who entered before the new rules were passed should be allowed to come up for examination at the time agreed upon, and would make a motion to that effect.

Mr. Gowing was of the same opinion, and was not sure whether the students so treated would not have some grounds for compensation. In his opinion it was a legal point.

The Chairman did not think the Council would act under any fear of that sort. He had no doubt their desire would be to do justice. The Council were, no doubt, thoroughly aware of the main points connected with the case. It would seem, from the notes he held before him, that the first step had been taken by the Scotch school themselves. As far back as 1872, Professor Williams brought up a petition from the school of which he was then principal, requesting that the examination might be divided into two parts, instead of being conducted on the same evening, as had been hitherto done. Then at the meeting of Council, in January, 1873, the committee which had been appointed at the previous meeting in October, to consider the whole subject of examinations, brought up their report, and it was considered clause by clause, and the clauses as amended were agreed to. They were suspended in the Council room for the required time, and in April, 1873, the new bye-laws were read, or taken as read, and confirmed, no dissentient voice then being raised to prevent them ; and he believed that, at the time, both the Principals of the Scotch and English schools were present.

The Secretary.—They were.

The President said that in October, 1873, Professor Simonds moved, at a meeting at which Professor Williams was present—although he believed that Professor Williams did not stay until that resolution was moved officially—that the examinations under the old system cease at Christmas, and that an advertisement be inserted into the *Veterinarian*

to that effect, and in the following number of the *Veterinarian* the advertisement was inserted; up to that time no opposition had been offered.

Mr. Cartledge said that he knew little of the merits of the case, but in order to test the feeling of the meeting he would second Mr. Moore's motion.

The President then put Mr. Moore's motion to the meeting in the following substantive form:

"That the prayer of the petition from the Edinburgh schools and the requests of the presidents of certain veterinary societies in support of these memorials be granted."

Professor Simonds, before the resolution was put to the vote, wished to make a few remarks on the subject. He begged entirely to differ from the views that had been expressed on the matter. The Council had the power to appoint examiners, and also the power of making its own bye-laws to regulate the examinations, but he would remind the Council that up to the time of the passing of the bye-laws the Royal Veterinary College had the power within itself to send its students for examination at any time it thought fit; and he believed a similar power was invested in the Scotch school. The Veterinary College gave way, at the time of the passing of the bye-laws, upon the point; and now the Royal College was in a position to dictate what should be the length of period devoted to the studies of the veterinary students. The rule now is that a student should pass one winter session and one summer session at the same school before he could be eligible for his first examination, and a second winter session before he could go up for his second examination. The Royal College of Veterinary Surgeons said nothing of that kind previously to the passing of the bye-laws. Indeed, the Royal Veterinary College could, if it thought fit, send a student up to the College if he had only entered the previous day, so that there was no such contract entered into as Mr. Gowing would lead the Council to believe. The position in which the Scotch schools found themselves depended entirely on the acts of the gentlemen connected with these schools, and not on the Council. The movement originated with Professor Williams, and not only so; for when it was taken up by the Council, and a committee appointed, Professor Williams was one of the committee. It brought up its report, which the Council received, and subsequently the bye-laws were passed, and, after being suspended for three months, were, on the 8th of January, considered and confirmed. An alteration in the bye-laws, it was early seen, would be

inevitable, and the students that entered at the Royal Veterinary College last October were told that the system of examination was about to be altered, and the time for the examination also to suit the state of the altered examination. No sooner did Christmas arrive than a division was made in the class, and the October students were informed that they could no longer be allowed to attend pathological lectures, because these belonged to the second examination and not to the first. The time of the students who were eligible under the old system elapsed last December. Those gentlemen came up, therefore, for their examination last December, no alteration being made with them. But the students who entered subsequently to that date were, by the division of the classes, put into their right and proper position. That was exactly what should have been done in Scotland. If the examinations had gone on under the old system: if it was right to examine students, being rejected once, it would be right to examine them twice, or any number of times in succession, and so the rules and regulations might have been continuously suspended, and no reform would have been made because two, or three, or four men had been rejected. Were the Council going to stultify themselves? Having done everything legally, honorably, and fairly in every way, were they to undo what they had done? If the Council did so they would be acting unfairly to the old students that were still at, or who had left the Veterinary College. He did not think it fair to grant this permission to the students that were in the Scotch schools, and say to those that were rejected or did not think fit at December to come up for examination, that they would not be permitted to come up in April. If the Council stultified itself, he would demand, in the names of the students that had been rejected, and also of those that did not present themselves for examination in December last, that they be also examined under the old system, even although they had left the College.

On being put, the motion was lost by a majority of 12 to 4.

The report of the Court of Examiners, dated 30th and 31st March, was read; it stated that sixteen students had passed their examination, and one was rejected; and from the report dated 1st April it appeared that seven students passed their "First examination," and one was rejected.

The Secretary asked what fees the students who were rejected in December last would have to pay in July. They had already paid seven guineas.

The Chairman said that the matter was provided for by the

bye-laws, which state that an examination fee of seven guineas must be paid seven days prior to the first examination, and that each successful candidate shall further pay a sum of one guinea for registration fee. The seven guineas being already paid, he thought that the students who paid it had a perfect right to present themselves under the new system, and if they were successful, they would have to pay an additional guinea for registration. If the Council, however, had any difficulty upon the matter, the better course would be to refer it to the solicitors, but he apprehended that they did not desire to take advantage of any legal power they might possess to extort additional fees.

The Council accepted the President's view of the subject.

The obituary notice was read.

The Registrar's report was read, and authority granted for reprint of the Register.

Fees to Examiners.

Mr. Dray said that, in consequence of the alteration of the bye-laws affecting the examinations and the divisions of the examinations of the first, and final, and *pass* examinations, he wished to draw the attention of the Council to the sums voted for the fees for the practical examination. As there was now only one examiner, Mr. Cartledge, who resided any distance from Scotland, he thought it would be advisable to equalise the sums voted for the practical examinations in England and Scotland. Hitherto the sum of thirty-six guineas had been annually voted by the Council as fees to the examiners for England and Scotland. He now proposed, instead of such sums being voted annually for the purpose—

"That the sum of two guineas shall be given to each examiner engaged in the practical examination of the students for each day so engaged; but no examiner to receive more than the said sum in one day for this particular duty."

Mr. Harpley said it seemed curious that in April, 1871, £25 4*s*. was paid for the examination in Scotland, whilst the same amount served for two separate periods of examination in England. The same thing again happened in 1872. In 1873 it appeared that the Scotch schools had their students examined in December for the first time. For that £36 was paid as against £24 for London. During the winter examination in Scotland five examiners received two guineas each for the practical examination of seven students, whereas in England thirty-six students had been examined for twelve guineas with four examiners. Five practical examiners in Scotland examined seven students and received ten guineas;

in England four examiners examined thirty-six students for twelve guineas. There was such a vast difference in the number of those examining and the fees received that the Council should endeavour to agree as to what fee should be given to the respective examiners of England and Scotland. In dealing with the question he would remind the Council that they were voting away money. They had hitherto voted for London and for Scotland thirty-six guineas a year and no more. Therefore, if two guineas were voted each day for each practical examiner, the sum paid for examinations would be multiplied by a large figure.

Mr. Hunt said that the greater the number of examiners employed the greater would be the amount of fees coming in.

Mr. Greaves suggested that the matter should be referred to a committee, who would report at next meeting of the Council.

Mr. Hunt did not agree with that proposal, as notice of the motion had been given three months ago.

After some further conversation—

Mr. Balls seconded the motion, which was carried unanimously.

It was proposed by *Mr. Dray*, seconded by *Mr. Fleming*, and resolved—

"That the practical examiners in Scotland consist of Mr. Cartledge, Mr. Robertson, Mr. Robinson, and Mr. Paterson."

Attendance of Members.

Mr. Dray called attention to the frequent absence of members of Council at the meetings. He thought that if a record were kept of those that were present and those that were absent, and if this was embodied in the annual report, it would be some guide to the constituency at the annual meeting when the election took place. He begged to move—

"That a record be kept by the Secretary of the attendance and non-attendance of the members of Council at all meetings held, and that the said record be embodied in every annual report at the annual meeting in May."

Mr. Harpley seconded the resolution, which was carried unanimously.

House Committee.

The report of this committee was presented.

The Chairman said it would be necessary for the Council to consider if any steps should be taken in reference to the house they occupied before the expiry of the lease.

After some conversation, the *President* proposed—

"That the House Committee be requested to arrange, if possible, that the Council become yearly tenants, and if not that they take the house for the next three years at £100 rental, with power to sublet."

Mr. Broad seconded the motion, which was agreed to.

The report of the College Fund Committee was read, which showed that twenty-seven additional names had been added to the list of subscribers since the last meeting of Council, making a total of eighty-nine subscribers. The subscriptions amounted to £977 11*s.* 1*d.*, including a contribution of 200 guineas from Col. Sir F. W. Fitzwygram, and £50 from the Yorkshire Veterinary Society.

The Treasurer said that the actual amount of subscriptions received was more than £700, and that £200 of that was on deposit. It remained for the Council to say what further sum should be put on deposit.

It was proposed by *Professor Simonds*, seconded by *Mr. Harpley*, and resolved—

"That an additional sum of £400 be put to the deposit account."

The report of the Finance Committee and the quarterly balance sheet of the Treasurer's account were read and approved.

The present liabilities amounted to £118 5*s.* 8½*d.*, which the Committee recommended should be discharged.

Cheques were ordered to be drawn for the current expenses.

Messrs. Skelton and Batt were appointed auditors.

Report Committee.

The President, Mr. Fleming, and Mr. Harpley were elected as members of the Committee to arrange the annual report.

It was decided that the special meeting of the Council to consider the annual report be this year dispensed with.

Annual Dinner.

It was arranged that the annual dinner be held at the Albion Hotel, Aldersgate Street, on Monday, May 4th, and that Messrs. Dray, Harpley, and Moon form the committee to carry out the arrangements.

Veterinary Jurisprudence.

PLEURO-PNEUMONIA.—IMPORTANT MEAT PROSECUTION.

At the Borough Police Court, Wolverhampton, on Monday, April 13th, before Sir John Morris and J. Moreton, G. L. Underhill, and M. Ironmonger, Esqs., Thomas Evans, butcher, of Tower Street, was summoned for having had, on the 13th March, in his possession, on his premises, situated in Tower Street, the carcase of a cow, intended for the food of man, which was diseased, unwholesome, and unfit for human food, whereby he was liable to a penalty not exceeding £20.

Mr. Henry Underhill, town clerk, conducted the prosecution on behalf of the corporation, and Mr. Barrow defended.

Sir John Morris mentioned that this matter had been before the court on a previous occasion, and an application for an order for the destruction of the meat was refused.

Mr. Underhill then stated the case for the prosecution, and in doing so said it appeared that, on the 13th March, Mr. Love, the medical officer of health for this borough, received information that Dr. Millington had at his residence, at the Old Fallings, Bushbury, a small herd of cows, and that pleuro-pneumonia had broken out amongst them. He also heard that one of the affected cows had been sold, and removed from Bushbury to Wolverhampton, with the sanction of the veterinary inspector under the Contagious Diseases' (Animals) Act, and also the approval of a police officer. The cow was estimated to be worth from £25 to £30, but it was sold for £8, and brought into this borough and dressed for human food. The medical officer of health, on receipt of the information, at once caused the road leading from the Old Fallings into the borough to be watched, and the carcase of the cow was ultimately traced to a slaughter-house in Tower Street. One of the sanitary inspectors saw it there the same night, and communicated with Mr. Love, who went and examined the carcase, and afterwards pronounced it to be diseased, unwholesome, and unfit for human food, and he gave instructions for it to be seized and taken before a borough magistrate the next morning. Unfortunately Mr. Love had to leave the town early the next morning to attend on a subpœna at the Stafford assizes. In his absence one of the sanitary inspectors applied to the magistrates sitting in that court for an order to destroy the carcase, but owing to the absence of scientific evidence, and also to the fact of the inspector himself stating he believed the meat was fit for food,

the justices refused to grant an order for the destruction of the carcase. That it was intended for human food would be proved beyond all doubt, but the principal question to be decided was whether a cow suffering from pleuro-pneumonia, at a certain stage of the disease, was fit for human food, and that was a question that must be decided on scientific evidence only. It was held on all hands that a cow suffering from pleuro-pneumonia in the earliest stage of the attack might be slaughtered for human food without in the least affecting the persons who ate it, but when the disease advanced and affected the blood of the animal then it was considered that the animal, if slaughtered in that condition, would be unwholesome and unfit for human food. After this particular cow was slaughtered portions of the lungs were cut away, and were taken possession of by Mr. Hill, veterinary surgeon, who would tell the bench that an animal with lungs in the state he found them was unfit for human food. Whether it was so or not would be for the Bench to determine. Mr. Underwood then read the 250th section of the Wolverhampton Improvement Act, under which the proceedings were instituted, and explained that in anticipation of an objection being raised to the present proceedings, in consequence of the former application having been refused, he maintained that the section must be read in its entirety.

Mr. Barrow, in reply to Mr. Underhill, contended that the jurisdiction of the Bench was ousted by the fact that an application for an order for the destruction of the carcase had been refused. After Mr. Barrow had argued in support of his contention,

The Bench intimated that they would hear the case.

Mr. J. W. Hill, of the firm of Messrs. Cartwright and Hill, veterinary surgeons, was then called, and stated that on the 13th of March he was in attendance upon a herd of cows at the Old Fallings Farm, Bushbury, and his attention was directed by Dr. Millington to one of the animals, which was suffering from pleuro-pneumonia. The animal was slaughtered the same day on the premises, and he afterwards examined the carcase. It had been suffering from pleuro-pneumonia for several days, and on examination he found it was unfit for human food. He particularly examined the lungs, and found them in an advanced stage of pleuro-pneumonia. The left lung was extensively diseased, and gangrene had commenced in one portion of it. There was consolidation of one of the lobes of the right lung. The pleura was thickened on both sides, and adhesion of the left lung to the pleural surface of the ribs existed. He pointed this out to Dr. Millington, who concurred in his opinion that it was unfit for human food. He thought it was wrong——

Mr. Barrow.—I object to your giving any conversation if the defendant was not present.

The witness, continuing, said the defendant was not present at the time, but two of his men were. He saw the cow sold by

Dr. Millington, whom he also saw receive £8 for it. If the cow had been sound it would have been worth £30.

Mr. Underhill here stated that what he wished to know was, whether Dr. Millington, who stood first amongst the medical gentlemen of Wolverhampton, and who was the principal physician to the Wolverhampton and Staffordshire Hospital, sold this cow, which, if it had been sound, would have been worth £30, to a butcher's assistant for £8 for the purpose of human food.

Mr. Hill said that pleuro-pneumonia was a blood disease, and the flesh of animals suffering from blood disease was unfit for human food. His reason for this opinion was that the blood, being in an inflamed condition, poisoned, as it were, must more or less affect the flesh it nourished. The blood was purified by the lungs, but if the lungs were diseased they could not properly purify the blood, and it went forth from them in an unhealthy state. He could not say how long the animal had been suffering from the disease, but it must have been for several days before he saw it. Mr. Beddard, veterinary surgeon, signed the certificate for the removal of the carcase, although Dr. Millington had said it would be most wicked for such an animal to be used for human food.

Mr. Barrow: I object to this.

Mr. Hill said Dr. Millington said he was in the hands of Mr. Beddard, who signed the certificate. Witness took possession of a portion of the cow's lungs before the carcase was removed, and it was then in Court. It had been seen by Mr. Love, Mr. Newnham, Dr. Collins, Mr. Vincent Jackson, Mr. Cartwright, and one or two other professional gentlemen. The carcase was sold with the sanction of Mr. Beddard, the veterinary inspector, and Sergeant Billett, the police inspector under the Act for the district of Bushbury. In cross-examination by Mr. Barrow, the witness stated that he saw the defendant's assistant make the bargain and pay over the £8 to Dr. Millington, and he told the man that the carcase was not fit for human food. He also met Police-sergeant Billett the same day, and told him the animal was unfit for human food, and that it ought to be buried, but Billett did not agree with his opinion. He then asked Billett, "Should you like any member of your family to eat it?" and he replied, "I cannot say that I should." He next asked him why he had sent for Mr. Beddard, and Billett said he did so because he was the appointed veterinary inspector for Bushbury parish. Witness at first denied this, and Billett then produced a paper issued from the Chief Constable's office, at Stafford, showing that Mr. Beddard was the appointed inspector. Billett told him that Mr. Beddard considered that the meat was fit for human food, and he replied that he differed from that view. He did not appear before the magistrates when Inspector Dawson applied for an order to destroy the meat, because Dawson led him to believe that he would not be required.

Mr. H. J. Cartwright, the senior partner of the last witness, was next called. He stated that he professionally attended the cow in question. On the Thursday evening he told Dr. Millington that he could give no hope of the animal's recovery. He had since seen the lungs of the animal, and was of opinion that the carcase was unfit for human food. As the disease advanced in an animal the temperature of the body increased and fever came on, thus affecting the whole system. He had no doubt whatever that the carcase was unfit for human food.

Mr. Love, the medical officer of health, next stated that he had examined the carcase, at the defendant's slaughter-house in Tower Street, on the night of the 13th March. Portions of the lungs presented marbled appearances, which were strong proofs of the animal having been affected with the disease. The carcase was certainly unfit for human food. In cross-examination, he said that Inspector Dawson did not express any opinion when in the defendant's slaughter-house about the animal being unfit for human food.

Mr. C. A. Newnham, surgeon, was next called, and stated that he saw the lungs of one of Dr. Millington's cows that died previous to the one in question, and which was buried. He also saw portions of the lungs of this cow, and they were in a worse condition than the lungs of the cow that died and was buried. He agreed with the evidence already given that the carcase was unfit for human food.

Dr. Collins next said that he had heard all the evidence given and he had seen a portion of the lungs. He agreed that the cow was unfit for human food.

Messrs. A. L. Butters and *Mr. Lowe*, veterinary surgeons, and assistants to Messrs. Cartwright and Hill, also confirmed the opinions already expressed.

This concluded the case for the prosecution.

Mr. Barrow, in addressing the Bench for the defence, said the question at issue was not only one of considerable importance to the defendant, but to the public at large. The evidence which had been adduced consisted chiefly of scientific opinions, whereas the evidence he should put forward would be that of the persons who saw the cow whilst alive, and also of practical men who examined the dead carcase; besides, he thought that the fact of the previous application to the Bench for an order for the destruction of the meat being refused, was a strong reason why the present summons should be dismissed.

Police-sergeant Billett was then called. He said he was fetched to Dr. Millington's farm on the 13th of March, and he there saw the cow in question, and afterwards sent for Mr. Beddard, the veterinary inspector for Bushbury parish. On arriving there, Mr. Beddard examined the cow, and directed witness to have it slaughtered, and he did so. In his report of the case that he sent to Stafford, he estimated the cow to be worth £30, although the county could not allow Dr. Millington more than £20. He saw

the animal sold for £8, but Dr. Millington would not gain a penny by the transaction. The cow was sold before it was slaughtered. Mr. Hill never said a word to him that it was unfit for human food, and he was quite surprised to hear that gentleman make such a statement. Mr. Hill at first denied that Mr. Beddard was the veterinary inspector appointed under the Act. In cross-examination he stated that he relied on Mr. Beddard's opinion that the animal was fit for human food. Dr. Millington did not tell him that Mr. Hill had stated that the animal was unfit for human food. Dr. Millington asked him if he should be safe to sell the cow after hearing Mr. Beddard's opinion, and he replied, "There is a certificate; you may rely upon it." Dr. Millington did not express any opinion to him about it, and he was not to blame in any respect in the matter.

George Evans, brother to the defendant, was next called. He said he had been managing his brother's business during an illness. On the 13th of March he received information from Mr. Beddard that there was a cow for sale at the Old Fallings, and he at once drove there. He saw Dr. Millington, of whom he asked the price of the cow, and was told £14. He replied that it was not worth that much to him. Billett said it would have to be slaughtered on the premises, and witness offered £8 for it, and eventually Dr. Millington accepted his offer. Mr. Hill was there, but he did not hear him say that the animal was unfit for human food.

Sir John Morris: Why would you not give £14?

Witness: Because I wanted to get it cheap (laughter). He had bought many a sound cow for less than £8. In cross-examination he said he knew that Mr. Beddard had given a certificate that it was fit for human food. The carcase weighed 8 score per quarter, and he was aware that the price he paid for it was about $2\frac{1}{2}d.$ per lb., although if the cow had been sound it would have fetched £23 or £24 alive in the market. He sold one side of the carcase to Mr. Lewis, butcher, Monmore Green, for $5\frac{1}{2}d.$ per lb., and he sold the other side to another butcher, whose name he did not know, but who gave him nearly £8.

Mr. Underhill: So you made a pretty good profit out of the cow.

The witness simply gave a nod of the head, amidst some laughter, in reply to this question.

Mr. E. Beddard, veterinary surgeon, Skinner Street, was next called. He said he considered the cow was fit for human food, although he did not give his certificate to that effect till the next morning after it was slaughtered, owing to Billett having no forms. He told Dr. Millington that it was most decidedly fit for human food, but Dr. Millington replied that his butcher would not buy it, and if witness could send a butcher to purchase the cow he should be obliged. He therefore sent the witness Jones. In cross-examination, he said he saw the lungs the next morning after the cow was slaughtered, and if any portion of

them had been removed it was only a microscopical section. He was quite sure a quarter of a pound, much less the 9 lbs. produced, was not cut away.

A jar containing a portion of a cow's lungs in a highly diseased condition was here produced, and witness said that the cow from which that was taken would be decidedly unfit for food.

Mr. Dawson, inspector of nuisances, stated that he saw the carcase after it was dressed, in Tower Street, and it seemed perfectly sound. He only came to this conclusion by reason of its general appearance.

Mr. E. Ward, inspector of nuisances, stated that he saw the meat; it was firm, and well fatted.

Mr. A. Gough, butcher, Darlington Street, one of the meat conners for the borough, said he saw the carcase, and considered it fit for human food, but he would not have bought the animal himself.

Mr. Boulton, butcher, Snow Hill, corroborated the evidence of the last witness as to the condition of the meat, but he also said he would not have bought the cow.

Mr. Fisher, assistant to Messrs. Cartwright and Hill, was then called by Mr. Underhill to give rebutting evidence respecting Sergeant Billett's denial that Mr. Hill said the carcase was unfit for human food. He said he was with Mr. Hill at the time, and he confirmed his statement.

The Magistrates then retired to consider their decision, and were absent a short time. On their return into Court, *Sir John Morris* announced that the Bench had very carefully considered the case, and they had decided that, upon the scientific evidence which had been given, the meat in question was unfit for human food. However, they should dismiss the summons against the defendant, on the ground that he purchased the carcase under the legal certificate of the appointed veterinary inspector that it was fit for human food, and afterwards disposed of it with the sanction of the inspector of nuisances for the borough. Therefore, the Bench need not enter into the technical question.—*Wolverhampton Chronicle.*

THE CASE OF THE EDINBURGH VETERINARY MEDICAL SOCIETY.

The following is Lord Mackenzie's interlocutor in the action at the instance of the Trustees of the members of the Edinburgh Veterinary Medical Society against the Dick Trustees and Principal Fearnley, of the Edinburgh Veterinary College, for delivery of the library, *materia medica*, and other property belonging to the Society:—

Edinburgh, 10th April, 1874.—The Lord Ordinary having heard counsel for the parties, and considered the closed record,

proof, and process, finds and declares that the defenders—the Lord Provost, Magistrates, and Council of the City of Edinburgh, as trustees of the deceased Wm. Dick, Professor of Veterinary Science in the Veterinary College, Edinburgh, under the trust disposition and settlement libelled on, and the defender William Fearnley, as principal of the said Veterinary College, have no right and title to the library, *materia medica*, and other specimens, models, and other property belonging to the Edinburgh Veterinary Medical Society, and members thereof, presently situated within the premises in Clyde Street, Edinburgh, of the said Edinburgh Veterinary College: Finds and declares that the pursuers as office-bearers and members and the other members of the Edinburgh Veterinary Medical Society have right to the whole books, periodicals, *materia medica*, and other specimens, models, and effects purchased for or acquired by and belonging to the Edinburgh Veterinary Medical Society, presently situated within the said premises in Clyde Street, and decerns: Appoints the pursuers to lodge in process, on or before the first sederunt day of May next, a list of the said books and other effects which they aver to be the property of the said Society, and to be in the possession or under the control of the said defenders; reserves the question of expenses, and appoints the case to be put on the roll with a view to further procedure.

(Signed) D. Mackenzie.

Note.—The "Edinburgh Veterinary Medical Association" was established in 1834 for the advancement and diffusion of veterinary knowledge, particularly among veterinary students, to whom there were by its rules afforded opportunities for the discussion and consideration of questions connected with their profession. The minutes and rules of the Society previous to 1841 have been lost, but by the rule of that year it is provided that "the members of the association shall consist of veterinary surgeons and veterinary students only, that members shall be elected by the association, and that out of the members there shall be chosen six office-bearers—namely, a president, two vice-presidents, a treasurer, secretary, and librarian." It appears from the minute book that the title of the "Edinburgh Veterinary Medical Association" was retained until 1865; in that year the title of the "Edinburgh Veterinary Medical Society" was adopted, and it was afterwards retained. Mr. Gamgee having, in 1857, started another veterinary school in Edinburgh, a bye-law was passed by the Society on 20th January, 1858, providing that the members shall consist of veterinary surgeons and veterinary students attending the London or Edinburgh Veterinary Colleges, and that if any member should attend any rival school or society in Edinburgh, he should forfeit his membership and the whole privileges thereof. The right of students to become members was subsequently limited to those attending the Edinburgh Veterinary College, and in 1868 the above-mentioned rule was

altered to the effect of providing that a member becoming a student of any other college should not cease to be a member of the Society so far as attending its meetings, but should forfeit his right to the use of its library and periodicals. In 1863 the rules, as altered, provided that Professor Dick should be president, and the other lecturers in Clyde Street College should be vice-presidents of the Society. It was afterwards provided in 1868 that the Principal of the college should be president. These rules, as so altered, remained in force until October, 1873. The minute books of the Society show that the Society managed its own affairs, applied its funds, which were derived from the entry money and fines of the members, to the purchase of books, periodicals, and otherwise for the benefit of the members, made from time to time catalogues of its library, and framed rules which regulated the use of its library by the members. Professor Dick died in 1866. By his trust disposition and settlement he conveyed his means and estate to his sister in liferent and to the defenders, the Lord Provost and Town Council of Edinburgh in fee, his trustees, for the purpose of maintaining in efficiency his Veterinary School in Clyde Street. Mr. Williams was appointed by its trustees Principal of the College in 1867, and held the office until he was succeeded by the defender, Mr. Fearnley, who was appointed Principal in August, 1873. Mr. Williams thereafter started another medical school in East London Street, Edinburgh. The place is specified in the rules where the Society should hold its meetings and keep its library, but the Society always held its meetings in the theatre or lecture room of Clyde Street School down to 1873, and kept its books there, and in the reading room the periodicals lay on the table for the use of its members. This was done by permission of Professor Dick, and afterwards by his trustees, no payment being made for the same. The first meeting of the Veterinary Society for the winter session of 1873–74 was held in conformity with its rules on 31st October, 1873. It took place by permission of Professor Fearnley in the college lecture room—Mr. Fearnley in the chair. Upon a motion being made that another member should take the chair, Mr. Fearnley immediately stated that he dissolved the meeting, and ordered the members of the Society to leave the room. This they did, and nearly the whole of them forthwith adjourned to No. 5, St. Andrew Square, where they proceeded with the business of the Society, directed by the rules to be done at that meeting. A very large number of students resolved not to attend the Clyde Street College, but to attend the lectures given by Mr. Williams. The members, who constituted the majority of the students, members of the Society, considered that the objects of the Society would be best promoted by the students of both schools having perfect freedom of attendance at its meetings and full use of its library. Accordingly, at the said adjourned meeting of 31st October, a committee of six members was appointed to alter the rules, and submit

them as altered to the Society for approval. The report of this committee was submitted to the meeting of the Society held on the 14th November, 1873, in No. 5, St. Andrew Square, and the proposed alteration on the rules was submitted and unanimously approved of. These rules so altered, at a meeting held on 5th December, 1873, were unanimously ordered to be authenticated by the president's signature. By these altered rules it is provided that any veterinary student may be elected as member, that the vice-presidents and office-bearers shall be elected by the Society annually, and that every member shall have the use of the library and all the advantages of membership. On Monday, 17th November, 1873, Mr. Fearnley and ten student members of the Society who had resolved to study at Clyde Street College, held a meeting in Clyde Street lecture-room, and proceeded with the election of office-bearers and also members, on the footing that they constituted a meeting of the Society, and they and other persons elected by them as members have since that date held meetings in the same place and on the same footing. Mr. Fearnley and these ten members were aware of the meetings held in St. Andrew Square, and six of them had attended the adjourned meeting on 31st October, held in that place; and the trustees of Mr. Dick and Mr. Fearnley, having refused to deliver the library and other effects of the Society to the office-bearers and members meeting in No. 5, St. Andrew Square, the present action has been raised against them, and also against the student members of the Society who met in Clyde Street on 17th November, 1873, and others to obtain such delivery. No appearance has been entered by these student members, and the only defenders who have lodged defences are the Lord Provost, Magistrates, and Council, as Mr. Dick's trustees, and Mr. Fearnley. These defenders plead that it is an essential part of the constitution of the Society that it shall be adjunct to the Edinburgh Veterinary College, and should only exist in connection therewith; and the library and other effects concluded for were founded and in part endowed by Mr. Dick as auxiliary to the study of veterinary science in the Edinburgh Veterinary College. The Edinburgh Veterinary College is not incorporated; it is merely a private school for teaching veterinary science and medicine. The building in Clyde Street, in which it was carried on, was the property of Mr. Dick, and now belongs to the defenders—these trustees—for the purposes of trust settlement. The Edinburgh Veterinary Medical Society is a voluntary association, which is not dependent upon the Veterinary College, or upon Mr. Dick or his trustees, for its existence. It was, no doubt, started for the purpose of assisting in their studies Mr. Dick's students, then and for many years afterwards the only veterinary students in Edinburgh, and accordingly it was allowed the gratuitous use of its lecture-room for its meetings, and a room in his premises for its library and reading-room. But it is a separate and independent association, having office-bearers

chosen by its members, who are entrusted with its affairs. The expenses of the Society were paid out of its own funds, its books were purchased with its funds, or presented to it, and it had and has a treasurer for the care of its funds, a librarian for the management of its library, and a curator for the care of its property. Its books are the property of the Society and its members, and are not the books of the trustees or of the Veterinary College or School, and that college may cease to exist without affecting the existence of the Society. The Lord Ordinary is therefore of opinion that the above-mentioned pleas of the defenders—Mr. Dick's trustees and Mr. Fearnley—are not well founded, and that these trustees and Mr. Fearnley, as Principal of the College, had no right or title to the library, museum, or other property of the Society. Mr. Fearnley being Principal of the College was, by the rules of the Society then in force, president of the Society, and entitled to take the chair at its first meeting. The Lord Ordinary thinks that Mr. Fearnley was not, as president, entitled to dissolve the meeting. If a motion was made contrary to the regulations, he should have ruled accordingly; but if it was in accordance with these regulations he should have put it to the meeting. Being Principal of the College he had charge of its premises, and the members of the Society did right in leaving these premises when ordered by him to do so, though nothing had occurred at the meeting which rendered any such order necessary, or, as the Lord Ordinary thinks, proper. Mr. Fearnley's act did not prevent the Society from proceeding with its business on that night in accordance with its rules, and the majority of the members at that meeting were entitled, the Lord Ordinary conceives, to adjourn as they did to 5, St. Andrew Square, and transact the business of the Society prescribed to take place at its first meeting. The members were also entitled to meet there afterwards and conduct its business in accordance with the rules. According to the usage of the Society, the management of that business was left, as in the case of similar societies, to its student members. who were bound to attend under the penalty of a fine for non-attendance. It appears to the Lord Ordinary that the student members who met in St. Andrew Square on 31st October, and weekly afterwards, were entitled to hold these meetings, and that the defenders, Mr. Dick's trustees and Mr. Fearnley, as the Principal of their College, are not entitled to object to what was done at these meetings. The rules of the Society provided that meetings should be held every Friday during the winter session, and no notice of these was prescribed or required. The whole of the ordinary members knew that the Society was holding its meetings at No. 5, St. Andrew Square. The Lord Ordinary considers that these meetings were meetings of the Society, and that the procedure at these meetings was in accordance with the rules; and that the meetings which took place in Clyde Street on and after 17th November were not meetings of the Society. The

defenders object to the procedure whereby the rules of the Society in force in October, 1873, were altered, on the ground that the rule is not complied with which provides that "none of these rules shall be cancelled or altered unless a fortnight's notice be given, and then only by the votes of a majority of at least two thirds of the Society." That majority means, it is thought, and according to the usage of the Society is, a majority of two thirds of the members present at a meeting of the Society, and cannot mean a majority of two thirds of those who had joined the Society since its commencement in 1834 and were alive. These members are, it is proved, upwards of 400 in number. Very few of them are resident in Edinburgh, and if the latter view were the correct construction of the rule, the result would be that the rules could never be altered. The procedure whereby the rules were altered was, in the opinion of the Lord Ordinary, a sufficient compliance with the above-mentioned rule. These rules were altered on the report of the committee appointed for the purpose. More than a fortnight's notice was given before the alteration, and the rules as altered were adopted unanimously on the 14th November, and were unanimously appointed to be authenticated by the president of the Society on the 5th December, 1873. On these grounds the Lord Ordinary is of opinion that the pursuers, as office-bearers and members of the Society, have a right to obtain possession of the library, museum, and other property of the Society in order that they may hold and adminster the same for behoof of its members. It is of importance to the prosperity of the Society and veterinary students in Edinburgh that its affairs should be conducted so as to give its benefits to every veterinary student who may desire to become a member, irrespective of the school at which he may study, and the Lord Ordinary therefore trusts that an amicable arrangement may be made which may render it unnecessary to pronounce any finding under the petitory conclusion of the summons. Such an arrangement would be beneficial not only to the students of both schools, but also to the Society, whose finances are scanty enough to secure the beneficial objects for which it was instituted and exists.

(Initialed) D. M.

Counsel for the Pursuers—Mr. Balfour and Mr. Strachan. Agents—Messrs. Macgregor and Ross, S.S.C.

Counsel for the Dick Trust—Mr. M'Laren. Agents—Messrs. Millar, Allardice, and Robson, W.S.

Counsel for Mr. Fearnley—Mr. Asher. Agent—Mr. Wm. Duncan, S.S.C.

NEW MEMBERS OF THE PROFESSION.

At the several meetings of the Court of Examiners of the Royal College of Veterinary Surgeons held during the week commencing March 30th, the following students from the Royal Veterinary College, London, received the diploma of the College, and were admitted members of the profession:

March 30th.

Mr. Thomas Thursfield	Bridgnorth, Salop.
— Robert Ruddle Cole	Newport, Isle of Wight.
— Thomas Stainton	Horncastle.
— Herbert Nixon	Sheffield.
— Frederick George Heap	Borough-on-the-Hill, Leicestershire.
— William Penhale	Buckland Brewer, Bideford.
— William Hartie Kennedy	Wrexham, Denbighshire.
— William Cooke	Gedney Hill, Spalding.
— William Penhale, Jun.	Holsworthy, Devon.

March 31st.

Mr. James Cleveland	Brampton, Suffolk.
— John Reynolds	London.
— Frederick William Hanks	Hackney.
— Anthony Willows	Wereham, Norfolk.
— James East	Aylesbury, Bucks.
— John Dixon Bremner	Valentia Co., Kerry.
— Adam Cuppage Webb	Norwich.

Students of the Royal Veterinary College who passed their "First Examination" at a meeting of the Court of Examiners held April 1st:

Mr. Murray Anderson.
— Frederick Adsetts.
— John Tarver Burden.
Mr. Richard Thompson.
— Henry Arthur Muffitt.
— Frederick George Davis.
Mr. John Clayton Jones.

At a Meeting of the Court of Examiners of the Royal College of Veterinary Surgeons, held in Glasgow, April 15th, the following students from the Glasgow Veterinary

College passed their Examination and received the diploma of the College.

April 15*th.*

Mr. Alexander Barr . .	Beith, Ayrshire.
— William John Gabbie .	Holywood, Co. Down.
— Robert Pringle . .	Limekiln, Stranraer, Wigton.
— Gavin Scott . . .	Bothwell, Lanarkshire.
— Samuel Gillespie . .	Ballymena, Ireland.
— James Cochrane . .	Lanark.

At the Meetings of the Court of Examiners of the Royal College of Veterinary Surgeons, held in Edinburgh, on April 16th and 17th, the following students from the Veterinary Colleges of Edinburgh passed their Examination and received the diploma of the College.

NEW VETERINARY COLLEGE.

April 16*th.*

Mr. Augustus Burney Wren .	Manchester.
— Edwin Faulkner . .	Manchester.
— James Alexander Bole .	Castlebar, Co. Mayo, Ireland.
— Gerald Herbert Fenton .	Doncaster.
— Hugh Robert Bradshaw .	Clonmel, Ireland.
— Edwd. Alleyn Evanson Ashe .	Cork.
— David Chambers Pallin .	Dublin

April 17*th.*

Mr. William Matthews . .	Alford, Lincolnshire.
— Henry Morris . . .	Wick, Caithness.
— William Anderson . .	Keith, Banffshire.

VETERINARY COLLEGE, EDINBURGH.

April 17*th.*

Mr. John Robert Urquhart Dewar	Midmar, Aberdeen.
— William Gladstone . .	Yetholm, Roxburghshire.
— Peter Edwin Rothwell .	Tottington Bury, Lancashire.
— Lancelot Thomas Barker .	Skelton-in-Cleveland, Yorkshire.
— John Corbett . .	Simonburn, Northumberland.

PARLIAMENTARY INTELLIGENCE.

THE IRISH CATTLE DISEASES ACTS.

The following Bill has been introduced by Sir Michael Beach and the Attorney-General for Ireland: Whereas by "The Cattle Disease Act (Ireland), 1866," power was given to the Lord Lieutenant or other chief governors in Ireland, in the said Act mentioned, to make such orders and regulations as to him or them might seem necessary for the more effectually preventing the spreading of contagious or infectious disease amongst cattle, and for the other purposes in the said Act mentioned; and by the said Act provision was made for defraying the expenses necessary for the purpose of carrying the said Act into execution, and for other purposes in the said Act mentioned, by means of a rate to be assessed, subject to the limitations and in the manner prescribed by the said Act, upon the several Poor-law unions in Ireland in proportion to the net annual value of the rateable property therein, according to the valuation in force for the time being: And whereas by the said Act provision was made in case the amount so assessed should be insufficient that such further sums as should be required should be raised by means of further rates to be assessed, subject to the limitations, and in the manner prescribed in the said Act; and in case occasion should not arise for the application to the purposes aforesaid of the whole or any part of any moneys so raised, then all such moneys, or the remaining balance of the same, should be paid over to the treasurers of the said Poor-law unions, and be applied in manner provided by the said Act: And whereas the purposes to which such moneys might be applied under the authority of the said Act were extended, and the said Act was amended by "The Cattle Disease (Ireland) Amendment Act, 1870:" And whereas under the authority and for the purpose of the first-recited Act a certain sum of money was raised, but inasmuch as there was only occasion to expend for the said purposes a part of such sum, the balance was paid over to the treasurers of the said unions respectively, as provided by the said Act: And whereas a further sum being now required to be raised for the purposes of the said Act, doubts have arisen whether the powers in that behalf conferred by the recited Acts apply to and include cases where a portion of the previous levy has been paid over to the treasurers of unions, and it is expedient such doubts should be removed: Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. This Act may be cited for all purposes as "The Cattle Disease

(Ireland) Act Amendment Act, 1874," and the recited Acts and this Act may be cited for all purposes as "The Cattle Disease (Ireland) Acts, 1866-1874."

2. It is hereby declared that the provisions of section thirteen of "The Cattle Disease Act (Ireland), 1866," extend and apply to each and every case in which, for the purposes of carrying into execution "The Cattle Disease (Ireland) Acts, 1866-1874," and for the purposes therein mentioned, any sum of money shall be required, whether such case shall arise after the disbursement of any sum or sums raised under the provisions of the said Acts, or any of them, or after the repayment of any such sum or sums, or any part thereof, to the treasurers of Poor-law unions under the said provisions. Provided always, that no certificate or order under the authority of the said section thirteen of "The Cattle Disease Act (Ireland), 1866," shall authorise the assessment at any one time of more than one halfpenny in the pound on the net annual value of the rateable property in any Poor-law union, according to the valuation in force for the time being.

CONTAGIOUS DISEASES (ANIMALS) ACT.

Mr. J. Barclay asked the Vice-President of the Council whether the Government intended to bring in a bill to carry into effect the recommendations of the Committee of last Session for the amendment of the Contagious Diseases (Animals) Act.

Lord Sandon.—Considering the complicated character of this question, the conflicting evidence respecting it, and the great and varied interests involved, Her Majesty's Government are not prepared, at any rate this year, to bring in a Bill on the subject. The proceedings of the Committee of last year, upon which the hon. member bestowed so much labour, are a very valuable contribution to the consideration of the question. The Lord President is giving the whole matter his most serious attention, but until the Government sees its way to a satisfactory mode of handling it, we do not think it right to engage to bring in a measure.

THE

VETERINARIAN.

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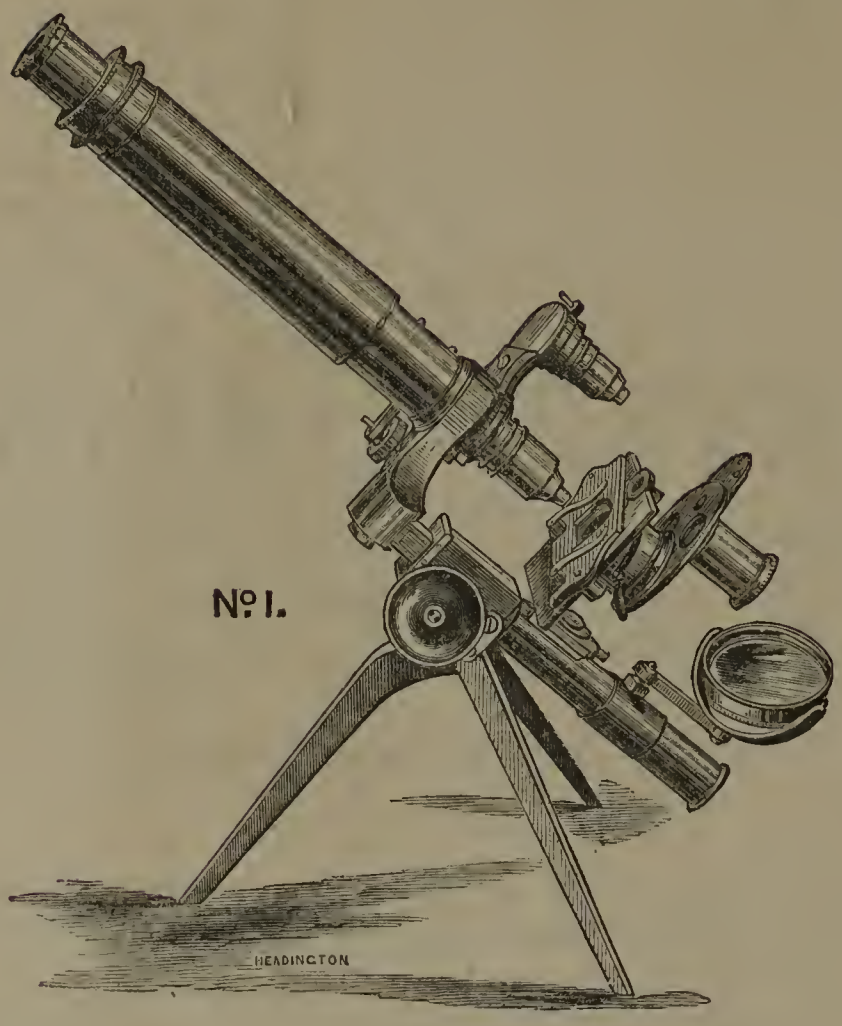
Communications and Cases.

A NEW FORM OF PORTABLE MICROSCOPE.

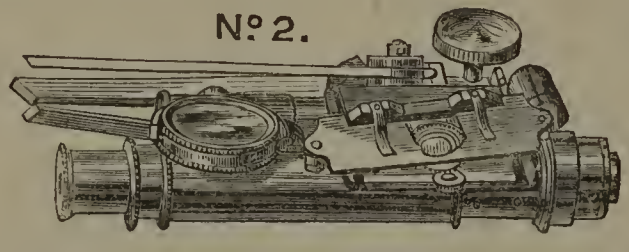
We have lately examined a microscope which has been made by Mr. Swift, of University Street, to meet the requirements of those who desire a full-sized instrument with various apparatus, arranged in a case so small as to be easily carried in the hand, or slung over the shoulder.

This microscope is so constructed that it can be readily set up for immediate use without having to screw any parts together. The whole of its joints and working parts are made to compensate for wear. When the instrument is ready for use, as shown in fig. 1, it is remarkably firm and steady, and may be worked with high magnifying powers; it has sufficient coarse adjustment for the 5-inch objective, a lever fine adjustment with central lift: the stage is large, and has an adjustable object carrier working upon glass bearings, which ensure smoothness of action: a ring is made to revolve in the centre of the stage by means of the small milled head marked B, for the purpose of rotating a selenite film when the instrument is used with apparatus for polarizing. There are flat and concave mirrors mounted on a crank arm. The optical tube of this instrument is of full size, with long divided draw-tube; the whole folds up with eye-piece, as



No. 1.

shown in fig. 2, and is packed in a mahogany cabinet 9 in. long, 4 in. wide, and $2\frac{1}{4}$ in. deep.



No. 2.

An achromatic condenser, especially adapted to the microscope, is shown in fig. 1. This, when used in conjunction with the revolving selenite holder above described, forms a good substitute for nearly all the forms of sub-stage apparatus, combining the achromatic condenser, spot lens, polariscope with selenite films, oblique light discs, and ordinary diaphragm.

The following pieces of apparatus are packed in the case with the microscope (see fig. 3).

Double nose-piece.	Analysing prism.
Camera lucida.	Dipping tube.
Stage forceps.	Zoophite trough.
Bottle ditto.	1-in. and $\frac{1}{5}$-in. objectives.
Stage condenser.	Achromatic condenser, &c.

The mahogany case is made to fit into a black leather satchel, with strap, so that it can be carried across the shoulders.

FATAL EPIDEMIC AFFECTING PONIES.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

In accordance with a promise made in the previous number of the *Veterinarian* I beg to direct the attention of the profession to the facts connected with the remarkable epizootic already announced (p. 314). Had the facts originally come under my notice only a few days earlier I should have been enabled to have recorded them in the May number of the Journal. However, deeming the matter of some importance, I lost no time in communicating such particulars as I had

already gathered to the pages of the *Field*, and although sent at the eleventh hour they were obligingly inserted by the Editor in the number issued for April 25th (p. 415). Probably, therefore, I cannot do better than reintroduce the subject by repeating the few data already published. Not that I have many more original observations to add, but that they may serve, in the first instance, to explain the position I had already taken up on this question prior to the receipt of the important additional particulars I have since received from Mr. Rees Lloyd. I may here also remark that a second paragraph referring to this epidemic has been accidentally misplaced in the previous number of this Journal (at p. 299); seeing that it should have been inserted under the description of *Tænia perfoliata* and not under that of *T. expansa*. With the exception of one trifling alteration, affecting the specific name of one of the parasites, my original statement of the facts in the *Field* runs as follows:—

On the 17th of April I received from Mr. Rees Lloyd, of Dowlais, Glamorganshire, a communication calling my attention to a fatal epizootic affecting ponies, and which was supposed by the writer to be due to parasites. On the following day I also received from Mr. Lloyd a parcel containing portions of the lower intestinal canal, which had been removed, *post-mortem*, from one of the diseased animals. The victim in question, a pony mare, had died on or about the 12th of April, at Llangunider, Breconshire. Mr. Lloyd states in his letter that he "presumes" that the pony's death was caused "by the presence of small worms"—examples of which he forwarded for the purposes of identification and investigation, together with other entozoa of the tape-worm genus. Mr. Lloyd had already inferred that his small worms were "strongles;" and in regard to the tape-worms he says: "This species has caused, or is supposed to have caused, the death of at least one hundred mountain ponies." On unpacking the box I found its contents in an excellent state of preservation, although the largest bottle was broken up into more than fifty fragments. The investigation was therefore immediately proceeded with, and I may so far anticipate my record of the results obtained as to state at once that the facts observed by me more than confirmed Mr. Lloyd's suspicions—proving, beyond a doubt, that the pony had succumbed to injuries inflicted by myriads of minute strongles. Not only did I find the fæcal matter of the colon loaded with strongles (the majority of which had arrived at sexual maturity), but the walls of the intestine were also occupied with encysted and immature forms of the

same nematode species. To such an extent had infection taken place, that I was enabled to count no less than thirty-nine strongles within the space of the one fourth of a square inch. All parts of the sections of the colon under examination were almost equally invaded; so that, taking the average, I am clearly within the mark in saying that every square inch of the gut yielded at least one hundred parasites. The walls of the entire colon must therefore have been occupied by tens of thousands of these creatures, to say nothing of the scarcely less numerous examples lying free or lodged within the fæcal contents of the bowel.

I have alluded to the presence of tape-worms. Mr. Lloyd has not, at present, informed me as to the actual numbers observed by him; but, judging from the size and character of the specimens sent, and also from their known frequency of occurrence in moderate numbers, I believe them to be insufficient in themselves to account for the fatality of the epidemic in question. I have no doubt, however, that, as in the parallel instance of the grouse disease, the presence of these cestode worms may aggravate the symptoms arising from the strongles.

In regard to these last-named entozoa, which are the true cause of the fatal epizootic, I may observe that, although their importance has hitherto been overlooked in this connection, the parasites themselves are well known to the helminthologist. I have repeatedly exhibited the worm to the students of the Royal Veterinary College; and in my recently published 'Manual' of the parasites of our domesticated animals, I have characterised it by its proper scientific designation (*Strongylus tetracanthus*), and have also in the same work given a life-size figure of the perfoliate tape-worm, page 110. Those who are unfamiliar with the subject will be very apt to confound the above-mentioned strongles with other species liable to infest the horse; for, according to my investigations, at least four other species of nematodes are liable to invade the tissues of solipeds. Of course I cannot now enlarge upon their various diagnostic characters; but I may mention that the "small worms" under consideration are quite distinct from the common palisade worm, and also from those sexually immature nematodes which I have recently described in the pages of the *Veterinarian*.

Practically, it is important to inform the persons most interested that an active drench may be serviceable in dislodging the free intestinal worms; but the administration of purgatives must not be persevered in. As in the somewhat parallel case of trichina disease in the human subject, the

fatality of the disorder depends not upon the free and mature worms, but upon the migrating and sexually immature forms. All attempts by means of active drugs to poison the entozoa, when once they have gained access to the tissues (whether actually capsuled or not), are worse than useless. By all means let the animals have a dose of aloes in the first instance, followed by warm bran mashes; but thereafter let every care be taken to support the patient's strength. Especially should the exhibition of turpentine be avoided. As to preventive measures, it is now too late, apparently, to do much good. The mild winter has favoured the multiplication of these parasites in their earlier larval stage of development. They have, I suspect, prodigiously multiplied by the non-sexual method, in open fresh waters, prior to their being swallowed by the ponies along with drink. Thus transferred to the alimentary canal, they speedily commenced to encyst themselves, their object being—as Leuckart's researches especially tend to prove—to pass through the higher larval stages that immediately precede the ultimate or definitive adult form, which latter, as we have seen, is arrived at within the passage of the colon.

Guided by these indications, the practical man—if not too proud to be taught anything at the hands of scientific workers—must perceive that the cause of this and other similar epidemics is primarily referable to atmospheric conditions. As he cannot alter these climatal changes, he must do his best to check the disorder by removing the victims to new localities; or, if the animals must remain in infected districts, by supplying them with various kinds of artificially prepared fodder, supplemented by carefully filtered water. In this way, I believe, the epidemic may be arrested; but it cannot be stamped out altogether, except by the adoption of measures which would be alike impracticable and unwarrantable.

Thus much I had written and published prior to the receipt of Mr. Lloyd's second and more extended communication, which arrived on the 3rd of April, and was to the following effect:

Dear Sir,—I regret to say that I cannot give you all the particulars respecting the subject of the tape-worms that I would wish, as I have either mislaid or lost the notes I made about November last; however, I will detail to you as much as I can remember. During the last twelve months, mountain ponies grazing on the lower districts of Breconshire, which comprise some of the highest mountains in South

Wales, have been dying in great numbers, from what the farmers indefinitely term inflammation. From what I have seen and heard, it appears that there are three causes of death—the tape-worm, the small worms (which I presumed were a kind of strongle), and catarrhal disorders such as have been common among horses of late; by far the greater number of deaths (from what I can glean) have been caused by the parasites. In the Ystradfellte or Penderin districts there has been no investigation, although the disease has reigned there for a longer period, about eighteen months, with (from what I have heard) a larger number of deaths than elsewhere; so I shall let these remain for the present, as I have not had an opportunity to see or hear anything authentic about them. In the Talybont district, the cause appears to be the small worms (like those I sent). The owner of the animals I saw said that a month ago, when he went to look after his ponies, they were appearing quite well, and looked to him as well as he could expect them this season, but was astonished to find some of them a fortnight ago looking very lean and wasting, and he thought that the weather was the cause of it, yet resolved to see them oftener; the next time he saw them one was dead, and knowing of the loss in the neighbourhood, and fearing he would be a sufferer, he sought aid, applying to me. When I arrived two days following, two more were dead, and they presented an emaciated appearance. The *post-mortem* examination revealed a healthy condition of the whole of the intestines, save slight thickening of some parts of the colon and rectum, which contained enclosed in the mucous membrane in cysts or minute sacs, worms coiled upon themselves. Each cyst containing one worm was best seen by transmitted light. The colon was nearly full of fæcal matter, which contained thousands of parasites scarcely visible; the largest of which were very few in number, and those not exceeding an inch in length and barely one sixteenth in diameter at the middle portion. They somewhat tapered at both ends. The cæcum was half full of fluid fæces, containing no visible worms; the rectum, with fæces of natural consistence, the examination of which revealed only two or three evident worms; so that the examination of fæces of living animals giving results like this would not assist the diagnosis, unless suspected. Small intestines,—these latter contained about a dozen bots, which were nearly free but had pierced to the muscular coat. I should think they had participated in the disease. The right lung had been slightly congested; nothing else abnormal to be seen. Possibly, congestion of lungs would arise

from the distress when pained with worms, for the pony was found on its back with its head in a thicket. It had not appeared to have struggled with its teeth firmly closed.

Not having been observed very closely, I could not gain much information about these animals, the chief thing noticed being emaciation; sometimes extending the head and wrinkling the upper lip, the appetite being apparently unimpaired. Generally, the Schneiderian membrane was injected as in slight cold, the fæces having no unusual appearance, and but slight staring coat.

Ordered those affected to be kept in a shed, and prescribed six doses to each, thus—

℞ Ferri Sulph., ʒij;
Gentian. Pulv., ʒiss;
Zingib. Pulv., ʒij;

to be given night and morning; and lastly—

℞ Liq. Aloes c. Sod. Carb., ʒiij;
Pulv. Zingib., ʒij;
Aquæ ferv. ad ʒx;

with instructions to examine dung, and to confine them until the action of the aloes ceases.

Respecting the animals affected with tænia, it is remarkable that as a rule they are in fair condition. The average time they appear to be troubled with the worms is two months, and the symptoms observed have been many. They are at first seen to be unable to keep up with the other ponies; extending the head and turning upper lip up; rubbing the quarters; staring coat; suddenly appearing distracted; seizing turf in mouthfuls when being griped or pained; others running away as fast as they can go, or rolling and kicking on the ground for five or ten minutes, then walking away as if nothing had happened; if coming down a slope quickly almost sure to fall headlong; easier caught; not unfrequently coughing; groaning noise; appetite good; and what is peculiar in some of them lameness of one of the hind limbs, mostly near hind leg, with slight knuckling over at fetlock.

Post-mortem appearance:—Abdominal viscera normal, save rectum, which is in some places slightly congested; colon nearly full of fæces; no worms; cæcum, in which worms are alone found, is nearly full of fæcal matter of thicker consistence than usual, and nearly half made up of worms; stomach half full of partly digested food; heart and lungs healthy; Schneiderian membrane injected; mucous membrane of trachea and part of larger bronchiæ of a more or

less livid colour (which may be owing to asphyxia); corner of tongue bitten off; mouth very close.

Several animals are found at times lying dead together.

Treatment was as follows:

Removal to an open shed and two ounces of the following mixture given every morning, fasting:

℞ Ol. Filicis Maris,
Ol. Absinthii,
Ol. Terebinthinæ,
Ol. Lini, āā, ʒij;

in gruel, to be followed with ʒiij of common salt and ʒij of Pulv. Zingib. in a pint of tepid water, the last morning fasting. I thought it better to use a saline purgative, thinking it to be safer, as this would also only temporarily deprive them of their liberty.

Lastly, I gave the ferrous sulphate and gentian, with aloes and ginger, which put the animal right. It voided worms and has not been affected since.

I may mention that a couple of dogs at the farm have suffered from *Tænia serrata*, and that a few doses of the oleaginous mixture put them right.

Of the *Tænia* as many as three or four ponies have been found dead on the same spot, which some hours previous had been seen grazing unaffected; and this to my own knowledge, one farmer having lost ten.

Of the small worms I have been told by a farmer that in his district one of his neighbours had lost twelve ponies.

I thought of sending the tape-worms to you some time ago, but I wished to say more about them, as I had noticed your appeal in the *Veterinarian* for specimens of parasites. Further, I thought they would be of interest, as I noted in your recently published work on the 'Internal Parasites of Domestic Animals' that they did not produce serious results.

Mr. Gamgee mentions that they are only found in the small intestines, whereas the situation I found them in was the cæcum.

With reference to the strongles I shall try to make further investigations.

It, therefore, only now remains for me to add that I am sorry I have been unable to send these particulars sooner.

Yours very truly,
Rees Lloyd.

The author of the foregoing very practical remarks may

rest assured that not only myself but many members of the veterinary profession are much indebted to him for the trouble he has taken to collect and record them. It will be seen that, in the main, our opinions are in harmony, but that as regards the immediate production of the disease Mr. Lloyd lays more to the charge of the tape-worms than I had been disposed to do. As Mr. Lloyd's conclusions are based on somewhat unusual and carefully observed data I have no hesitation in accepting his view of the matter. It is becoming more and more apparent every day that particular species of internal parasites which have all along been regarded as harmless are in reality hurtful, if not absolutely dangerous; and, in this connection, I apprehend that Mr. Lloyd's statements in respect of the *Tænia perfoliata* demonstrate that this common form of equine tapeworm proves no exception to the rule. I deem it a little unfortunate that my receipt of Mr. Lloyd's important communication came too late to enable me to insert some more extended notice touching the leaf-shaped tape-worm in the 'Revised List of Entozoa,' commenced in the previous number of this Journal. That list will be continued from time to time, and form the basis, I trust, of a much more extended revision of the parasitic fauna of domesticated animals.

In regard to the strongles (*S. tetracanthus*) I have made careful microscopic investigations and have satisfied myself respecting several doubtful points of anatomical structure. I must, however, leave these details for consideration elsewhere; at the same time, expressing not a little regret that it is practically impossible to find time to do full justice to the many helminthic contributions I receive both from England and abroad.

Appendix.—Just as I was on the point of forwarding the above remarks to the Editor, I received a third communication from Mr. Rees Lloyd, correcting me in certain points where I had misunderstood the bearing of his statements. Thus, writing on the 8th of May, he says:

"I think that I may not have made a clear explanation respecting the tape-worms in my report to you, as I find (in the *Field*, April 25th, and the *Veterinarian* for May) that you consider the tape-worms as subsidiary to the strongles in causing death. The ponies affected with tape-worms are in a district six or seven miles distant from those affected with strongles. Those troubled with tape-worms are in good condition, as a rule, up to death; they are noticed to be troubled generally for two months previous to death, and may be seen at one hour grazing and apparently well, and

dead or dying the next hour. As many as four have been found dead at the same spot. In this (the Beacons) district the tape-worms alone have been found and not a single strongle.

"In the Deangunid district strongles only have been found, such as I sent you. The ponies have been noticed ailing for three or four weeks; becoming rapidly emaciated and dying from exhaustion.

"In tape-worm-affected animals the cæcum is nearly half full of these parasites. The animals thus affected are on the red-sandstone formation, whilst those affected with strongles occur on the limestone formation—the latter affording the drier situation."

These additional facts certainly prove the truth of the position taken up by Mr. Lloyd as to the injurious nature of the perfoliate tape-worm, even when not known to be associated with strongles. Having received both kinds of parasites together, I naturally concluded that, as frequently happens in the grouse disease, the two causes of fatality had co-operated; and I had good *à priori* grounds for giving the strongles their unenviable preference in this matter. In certain cases of equine parasitism, already published, this association of strongles and tape-worms has been freely demonstrated, and it is of frequent occurrence in other domesticated animals.

I am particularly glad that I have now the authority of an experienced veterinary practitioner to testify to the injuriousness of *Tænia perfoliata* in the horse. Over and over again I have pointed out to the members of my class and to others the desirability of examining the fæces of solipeds where obscure symptoms of intestinal irritation existed. Not only so; I have written out prescriptions in the class-room and (at the request of medical friends) have prescribed for equine patients suffering from tape-worm. I am the more indebted to Mr. Lloyd inasmuch as his practical views serve to strengthen several propositions I have advanced in connection with internal parasites as a frequent cause of epizootics. My views have been criticised with a vigour and warmth well worthy of those who are afraid of advancing epidemiological science too rapidly; but it seems that so far from my having over stepped the bounds of moderation in this matter, I have, in reality been almost too cautious. In the particular case of the grouse murrain, my views have been ridiculed by persons who had no knowledge of the parasite, to the injurious action of which I attributed the epidemic.

From the evidence which Mr. Lloyd has supplied it can

now no longer be said that "the symptoms created by tape-worms in the horse are of little or no consequence." Here, therefore, we have made a clear advance in our knowledge of helminthic disease; and from the impulse thus given to hippopathology it is only reasonable to look for still further advance in veterinary medicine. By and by, the scepticism which not unnaturally exists in reference to entozoa as a frequent cause of death amongst animals, will be displayed by yet clearer enunciations regarding the important part these parasites play in the destruction of our most valuable creatures.

I have not time, at present, to enlarge further upon this interesting topic, but I am already in possession of facts which tend to prove that a large number of solipeds annually perish in Europe from internal parasites; the chief cause of this mortality being due to an entozoon totally distinct from either of the above-mentioned helminths.

Lastly, in this connection, I embrace the opportunity of thanking Mr. W. R. Bryan, M.R.C.V.S., of Londonderry, for some interesting specimens of palisade strongles which had occasioned the death of a mare, as he himself informed me in a communication received on the 11th ultimo. I am in hopes that notes of the case will shortly be published.

My acknowledgements are also due to Mr. Charles Gray, M.R.C.V.S., of Kibworth, Leicester, for other parasites.

COMPOUND DISLOCATION OF THE FETLOCK-JOINT: RECOVERY

By G. Fleming, M.R.C.V.S., Royal Engineers.

On the evening of February 24th, 1873, I was hurriedly sent for to barracks to see a troop horse reported to have "broken its leg." On my arrival, within a few minutes after the accident was discovered, which happened immediately the men had been dismissed from evening stables, I found the horse, an excellent trooper, and only six years old, outside the stable, covered with perspiration, breathing hurriedly, and evidently suffering intense pain. A glance at the left fore limb showed that a serious injury had been inflicted, as the hoof and pastern were turned outwards at a right angle to the cannon, with the inner aspect of the foot resting almost entirely on the ground; while what looked in the dull twilight

like a fractured bone protruded through the skin at the inside of the fetlock. There was very little hæmorrhage. A very brief examination, even before a light was procured, proved that it was not a fracture, but a case of compound dislocation of the fetlock-joint: the whole of the lower end of the metacarpal bone, with its smooth articular cartilage and prominent ridge, being completely exposed through a rent in the skin. It appeared that the horse, a somewhat fidgetty animal at feed, had, as usual, been stamping and pawing while eating its evening allowance of corn, and was visited by the stable guard only a few seconds before a noise was heard in the stable, as if one of the horses had got over the bale. On rushing to see what was the matter, the guard discovered the horse turned head about in the stall, the head-collar chain broken, and the fore limb in the condition I have described. Having procured assistance, he had the animal moved outside the stable, as he was afraid of its falling down. An inspection of the stall showed how the accident had occurred. Beneath the mangers, near the ground, are square apertures in the partition walls for through ventilation, and one of these was in this stall; so that the horse, it would appear, in pawing, got the hoof fixed in the hole, and had evidently struggled to release it, as the bricks below the manger were much scraped, and brick-dust was on the right fore foot. Unable to extricate the imprisoned hoof, the animal seems to have given a sudden and violent twist round in the stall, dislocating the fetlock while releasing its foot, and breaking the collar-chain. Of course such a case looked quite hopeless, and doubtless it would have been summarily disposed of by a rifle bullet had the accident occurred at an earlier hour, and had I not felt rather backward in recommending that the animal should be destroyed that day, as in the early morning we had been obliged to kill an officer's charger owing to its having sustained a compound comminuted fracture of the tibia by a kick from a vicious horse.

I resolved, therefore, to reduce the dislocation, which was done without much difficulty, bandage up the limb, and suspend the horse in slings until the morning, when we might have it put out of its misery without attracting so much attention to our bad luck. In order to prevent the pastern from becoming disarticulated and the metacarpal bone slipping through the wound in the integument, pledgets of fine tow were wrapped from midway on the shank to the hoof; these were retained by a long linen bandage; over this two sheets of gutta percha steeped in warm water were moulded, and fastened by strong bandages. The horse was then com-

fortably slung in the hospital stable, every care being observed in moving it there.

In the morning, with a good light, we were able to make a more minute examination of the limb than on the previous evening. The wrappings being removed, the extent of the tear in the skin was the most striking feature perceptible, as but little displacement had taken place since the dislocation was reduced. The wound was rectangular, the perpendicular portion being nearly four inches long, and extending downwards to the metacarpo-phalangeal articulation, while the horizontal tear was about the same length, and ran from the malleolus of the metacarpal bone to near the front of the fetlock. The internal lateral ligaments were evidently ruptured and the joint capsule extensively lacerated; but the tendons and important blood-vessels appeared to have escaped with but little injury.

Though all experience was against attempting a cure with any reasonable hope of success, it was decided to keep the animal alive for a few days, and to see what would take place. The horse was suffering most acutely, and would not eat; pulse 80 per minute; temperature 102°.

The limb was bound in the same manner as on the previous evening, bundles of tow were swathed over all, and a cold-water apparatus, consisting of a bucket of water with a syphon tube of lead and india-rubber, was improvised to keep the whole in a constant state of irrigation night and day. For the opposite limb a leather boot, furnished with a wooden sole about six inches thick, was devised to raise the animal's forehand sufficiently to prevent any weight being placed upon the leg which was injured.

The continued saturation of the limb with cold water appeared to give the animal much relief, and it soon commenced to eat. On the 28th the pulse and temperature were about the same. On removing the bandages and dressings the joint was found to be in as favorable a condition as the most sanguine could have expected; there was much swelling around the seat of injury, and extending up the tendons; a profuse escape of synovia had been going on, but there was little sloughing at the wound, and altogether the case looked sufficiently promising to warrant the experiment of treatment being continued for a few days longer. The wound was dressed with carbolised oil on pledgets of fine tow, and the limb bandaged in the same manner as before, the cold water saturation being continued.

On March 4th the bandages were again removed, and the wound was found to be healthy, though a considerable

amount of synovia was still escaping. No deviation from the natural direction of the pastern had occurred, and the horse was particularly careful in moving the limb. The same treatment was continued until the 26th of that month, when the cold water irrigation was discontinued. The discharge of synovia had ceased, the extensive wound was slowly cicatrising, but the whole articulation was much enlarged and painful. A cantharides blister was applied over it. The clog or "prop" boot was removed from the opposite foot, and it was found that the horse was not indisposed to rest a little of its weight on the injured limb. On April 8th the animal could walk a few paces without any great difficulty, placing the left fore leg on the ground with but little hesitation. The slings were now discontinued, and the horse kept in a loose-box on sawdust, where it lay almost persistently for some days, though when it rose it did so with the greatest caution and intelligence. Towards the end of April it stood nearly all the day, taking its exercise in the loose-box, and moving the injured limb pretty freely. The pastern of this was almost vertical, and the enlargement had not diminished at the inner side of the fetlock-joint, where the ligaments were ruptured; though the proximal phalanx could be readily moved on the metacarpal bone. The inunction of mercuric-iodide ointment around the whole of the joint was ordered.

Up to the commencement of July considerable improvement had taken place, though the pastern was still upright, and the enlargement in and about the cicatrix had not much diminished. Yet there was no sign of anchylosis; the horse could walk for some distance, but with some lameness, and altogether the degree of recovery was greater than could have been anticipated from the formidable lesions attending the dislocation. As at this date we were under orders for the Autumn Manœuvres in Staffordshire, and as the horse could not march, it was cast and sold by public auction in Rochester, when it fell into the hands of Mr. Austin, a farmer in the neighbourhood. It was turned out on the Medway Marshes, where it wintered, and I saw it last March. The lameness was all but imperceptible; there was no anchylosis; the pastern had regained much of its natural obliquity, and there was little more than the very conspicuous cicatrix to indicate that such a very serious accident had occurred. I was informed that, on the Marsh, the horse galloped about quite sound, and jumped the ditches as if nothing had ever been the matter. Recently I have been told that it is now at work every day, and the farmer cannot perceive it to be lame.

This case, so far as my experience goes, is not without

much interest; and I am ready to confess that it was little more than chance which led to the animal's being preserved from summary destruction when the accident occurred. Attempts to cure such grave injuries are not frequently made, and it may be that, in some instances at least, the knacker's assistance is too hastily invoked. Before this case came into my hands, I fancy I should have been ready to recommend the immediate destruction of any horse that had met with such an injury—even if far more worthy of preservation than this animal. On a race-course, for example, I would not perhaps have hesitated to suggest the propriety of administering a pistol bullet for an accident of this kind, and yet the animal might be a most valuable one—at the least for stud purposes. Even in this case, the farmer bought for about ten pounds a horse which he could not now replace for fifty or sixty pounds.

I should add that the animal was most docile and intelligent, and did much to aid us in effecting a cure.

"HARMLESS MAD DOGS."

By the Same.

In the leader in last month's *Veterinarian*, under the heading of "Harmless Mad Dogs," an extract is given from the *Globe* of April 21st, referring to M. Bourrel's proposed method of diminishing the risks attending the manifestation of rabies in dogs, by blunting the incisor and canine teeth of all these animals. Bourrel, the *Globe* says, proposed "to cut off and file down to a flat surface the front teeth and canines of our domestic carnivores." This is an error. Bourrel recommends that these teeth be reduced to so many *rounded blunt stumps*, incapable of wounding; it is obvious that, if filed down to a flat surface, the edges would remain sharp and thus be capable of at least abrading the skin. In "Rabies and Hydrophobia" (p. 360) I have drawn attention to this preventive measure; described the method of performing the operation, and illustrated it with woodcuts; as well as pointed out its merits and demerits. It is, in my opinion, well worthy the attention of veterinary surgeons, and in the above work I have recommended it for adoption.

CONGENITAL HYDROCEPHALUS IN A FŒTAL ASS.

By J. Wortley Axe, Assistant Professor in the Royal Veterinary College.

On the 13th of February of last year Mr. Dunsford, veterinary surgeon, forwarded to the College a fœtal ass, reported to have been dead when born. Its condition, however, when received by us, rendered it highly probable that it had lived for a brief period after birth. The body was small and feebly developed; it weighed, with the fluid contents of the cranium, only sixteen pounds and three quarters. The cranium was much enlarged and distorted, and yielded easily to the slightest pressure. It measured twenty-six inches in circumference, ten and a half inches from orbit to orbit, and fifteen inches from the occipital crest to the nasal bones. The parietalia had no ossific union; they were, indeed, considerably attenuated, and only slightly ossified. On opening the skull the dura mater was found to be much thickened in parts corresponding to the sutures, but in other respects it gave no evidence of altered structure. The sub-arachnoïdean spaces contained only a small quantity of fluid, and it is highly probable that this had been chiefly exuded after death. The convolutions of the brain were completely obliterated, and the two lateral ventricles were united in one large cavity. The cerebral substance was reduced to a layer of not more than one fourth of an inch in thickness. The lining membrane of the ventricles was somewhat thickened, and the several internal anatomical characters of the brain were completely effaced. The cavity of the cranium contained six pounds and three quarters of a pale transparent fluid; it had a slightly alkaline reaction, and on being boiled exhibited a faint turbidity, as it also did on the addition of nitric acid.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from p.* 304.)

The Alliance of plants that will now claim attention will be those of which the Geranium forms a centre, and therefore named—

GERANIALES.—THE GERANIAL ALLIANCE.

DIAGNOSIS.—*Hypogynous Exogens, with monodichlamydeous, symmetrical flowers, axile placentæ, an imbricated calyx, a twisted corolla, definite stamens, and an embryo with little or no albumen.* One of the best plants to observe these points will be the pretty *Oxalis* of the wood, or any of the numerous cultivated species.

Professor Lindley observes upon it that if we seek for a positive character by which the present alliance may be known from its relations, we shall find it in the combination of three circumstances, viz. a definite number of stamens, an imbricated calyx, and a twisted corolla. The natural orders of Geraniales are five, but we shall only direct attention to the four following:

1. LINACEÆ—FLAXWORTS.—*Flowers symmetrical, styles distinct, carpels longer than the torus, seeds with little or no albumen.*

2. OXALIDACEÆ—OXALIDS.—*Flowers, styles, and carpels of the same character; seeds with abundant albumen.*

3. BALSAMINACEÆ—BALSAMS.—Flowers very irregular and unsymmetrical; stamens distinct; albumen none.

4. GERANIACEÆ—CRANE'S-BILLS.—*Flowers usually symmetrical; styles and carpels combined round a long-beaked torus.*

1. *The Linaceæ* may here be represented by the *Linum usitatissimum*, the names of which point to the value of the plant, from the fibre of which flax and linen is made, while its seeds under the name of flax or linseed, commonly *linseed*, renders enormous service both to the practitioner and the farmer. With regard to its use in the fabrication of linen, we quote the following, by Mr. A. Smith, from the 'Treasury of Botany:'

"FLAX—*Linum usitatissimum*—is only known in the present day as a cultivated plant, or as occurring in a semi-wild state in places where it has escaped from cultivation. History tell us that it has been grown for its fibre from the earliest times of which we have any record, it being one of those plants which the wants of civilised man early taught him the use of; and the long period during which it has been an object of culture has, doubtless, as in other known instances, so altered the appearance of the plant that it is not recognisable in its original form, if such exists at the present day. The Bible affords ample proof of the antiquity of the use of flax as a material for weaving cloth. We read (Gen. xli, 42) that Pharaoh clothed Joseph in fine linen; and in the account of the plagues with which the Egyptians

were visited (Ex. ix, 31), we are told that the flax was smitten. From these passages it would appear that not only had the art of weaving reached a high state of perfection, but also that flax was one of the agricultural plants of Egypt at that early period; and this is confirmed by the representations of arts culture which occur in ancient Egyptian pictures which have descended to us. Moreover, microscopists have proved that the cloth used for wrapping round mummies, the antiquity of which is undeniable, was made of flax. Flax and linen formed an article of commerce between the ancient Egyptians and Greeks. The plant was also cultivated by the early Romans; but as their clothing was chiefly made of wool, it did not find much favour."

We have assisted in the unrolling of a mummy supposed to have been six thousand years old, in which the cere-clothes were composed of linen of various degrees of fineness, some almost equal in delicacy of texture to our *cambric* or *lawn*, and the very quantity that was employed showed how abundantly it must have been in use by the Egyptians.

Flax is employed by almost all nations for the finer sorts of underclothing, and hence the generic name of linen is applied to such; it is also much used for sailcloths and various other purposes, some of which may be well studied by examining the stock of a "linendraper," or, better still, a "ready-made linen warehouse."

We are told that Edward Campion, the Jesuit, declares of the "meere Irish," that "linen shirts the rich do weare for wantoness and bravery, with wide hanging sleeves playted," and adds, "Thirtie yards are little enough for one of them."

Flax and hemp were at one time more extensively grown in England than they are at present. In the new edition of 'English Botany' we find the following:—

"In 1531 a law was passed to compel one rood in every sixty acres of arable land to be sown with flax or hemp; and it seems then to have been the custom for every farmer to sow a small quantity for the use of his family, for Tusser says:

> "Good flax and good hemp, for to have of hir owne,
> In Maie a good huswife, will see it be sowne;
> And afterward trim it, to serve at a neede,
> The fimble to spin, and the karl for hir seede."

Flax culture is carried on to some extent in Dorsetshire and Somersetshire, principally with a view to the best sail-cloth manufacture, especially for yachts. A district extending from Sherborne to Bridport, in Dorset, is seldom without

some extensive fields of this crop, and at Yeovil, Somerset, there is a flax market.

It is, however, considered so exhausting a crop that landlords often object to its growth, and not without reason; we have grown flax, and though it is a profitable crop when the tenant has but a year or two's interest in the land, it cannot pay one who has an abiding holding. Pliny's assertion that it "scorches the ground," or renders it so unfertile as to appear as though scorched, has been fully justified. With modern farming the land has been restored to fertility, but not without so much expense that we do not consider flax-growing at all profitable. But, besides the fibre, flax yields a valuable oleaginous seed called linseed; from it is extracted an oil known as linseed oil, which is greatly employed by painters, and which mixed with lime water forms the well known "Carron Oil" used for burns.

The cake from linseed is well known for its use as a cattle food; it is one of the best of the waste products employed for fattening purposes, so much so that instead of linseed cake being the genuine crushed seed, it is now made for the market, and too often consists of useless and sometimes poisonous material. We have before us a card on which are printed the following items:

	Per ton. £	*s.*	*d.*
Linseed cakes, Hull made	.	.	.
„ extra good, ditto . . .	8	15	0
„ genuine, ditto . . .	9	15	0

This shows that at Hull "Linseed Cakes!" are made that must be anything rather than genuine, and besides this, we find that cake is called genuine when made from seed not previously purposely mixed with foreign matters, such as bran, beech-nuts, inferior seeds, &c., and therefore as a sample of what might be called genuine on this principle, we give the following analyses of some linseed taken from a mill where it was being made into cakes.

The following table is made from the examination of 2 oz., by measure, of the flax-seed casually taken up at a mill before being crushed, and from a heap in the process of crushing:

Analysis of some Genuine (?) Linseed.

2 oz. by measure yielded the following weeds.	Number of weed seeds.	Weight in grains.	Remarks.
Sinapis arvensis . .	292	24	Probably other mustards also.
„ nigra . .			
Agrostemma Githago corn cockle	24	12	A large weed very common in some of the foreign seeds.
Various undetermined weeds	160	40	Some of grasses or millet wild buckwheats, &c.
Bits of dirt and stones.	...	160	Probably derived from the flax-roots.
Total . . .	476	236	

Now, this acquaints us with the startling fact that every such sample of seed used by the farmer for sowing contains as many as *four thousand seven hundred and sixty weeds* to a pint! in themselves enough to stock the land; and in some flax sent us this year we estimated—

	Seeds per pint.
Of wild mustards (charlocks) . . .	4·640
Of other seeds	60
Total	4·700

So that too great care cannot be exercised in this respect, especially as the mustards really make cakes unwholesome.

Now, in the table first quoted it will be seen that we have—

	Grains.	Grains.
In a pint, weeds =	760	= 2,360
„ stones and dirt =	1,600	
Weight of separated seed =		2,680

Thus nearly one half is deleterious matter. No wonder then that cakes should be so different in their action and value.

To quote, then, from the *Gardener's Chronicle* for January 8th, 1859:—"With the sample of seed we have been describing freight has been paid upon nearly half its weight of dirt; surely this is a most expensive way even of dilution; surely it would be better to do as was recommended to the purveyor of milk (*vulgo* skyblue) when the tint of the fluid was more cerulæan than usual, 'Bring it as pure as you can, and we will dilute it as we require it.'"

The uses of linseed as a remedial agent are well known; it forms demulcent mashes and drinks, and in the powdered

state is commonly used for poultices and cataplasms: but as linseed and linseed meal are universal household commodities we need not enlarge upon their uses. Suffice it then to say that the flax plant is not one of the least important of our vegetable productions, and it is one of those in which the whole plant has its own special uses—its seeds, its fibre, and its waste products being all of great value.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of April, 1874, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Bremen	London	Foot-and-Mouth	8	...	...	...	8	8
Dunkirk	„	„	...	...	...	43	43	43
Hamburg	Hartlepool	„	7	...	...	...	7	7
„	Hull	„	...	10	...	...	10	10
„	London	„	10	...	...	...	10	10
Ostend	„	„	...	...	...	136	136	136
Rotterdam	Grimsby	„	...	...	...	1	1	1
„	Harwich	„	...	...	...	2	2	2
Total			25	10	...	182	217	217

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 14th May, 1874."

CATTLE PLAGUE.

Cattle plague is reported to have ceased in Hungary. In Poland it still continues at Poromski, Sluzen, and Kutno. From Vienna no fresh outbreaks are reported; but Croatia, Slavonia, and the military frontier remain infected. The plague also continues to exist in the Island of Naxos.

Cattle plague appears to have been introduced into Italy by some animals brought from Illyria into Capitania. Stringent measures were, however, put into operation, and by the isolation of the infected farm and the slaughter of all the cattle the disease was immediately stamped out.

The Chamber of Deputies at Bucharest have voted a sum of 150,581 francs to the Minister of the Interior to organize five quarantine establishments for cattle coming from Russia at certain points to be determined by the Government. Cattle can only be imported across the frontier in future at the points fixed upon; a staff, consisting of a veterinary surgeon and two assistants, is assigned to each station.

The Government, however, admit the impossibility of preventing animals being smuggled across the frontier.

FOOT-AND-MOUTH DISEASE.

This disease, which threatened at one time to become widely spread over the country, seems to have received a sudden check. During April numbers of cattle were found affected with the disease every market day in the Metropolitan market. In the last three weeks, however, the malady has rapidly declined, and not a single beast was discovered to be affected in a recent market in which there were 3800 head of cattle chiefly from the Midland and Eastern counties.

The various dairies, too, in the metropolis seem to be more free from the disease than they have been for some time past. The same remark is equally correct when applied to the suburbs of London.

It was noticed last year that the disease decreased at about the same time as it has done this.

PLEURO-PNEUMONIA.

Reports from Holland show that there is a slight increase in the returns of this disease for the month of April.

Facts and Observations.

Importation of Horses from the Argentine.—The *Times* of May 8th says that an importation of horses has just been made from the Argentine Republic. The number in the present arrival is 10. They have been chiefly used for the saddle, but are expected to prove suitable for a variety of harness purposes. "They show," it is stated, "some Arab breed, and have great endurance, having recovered rapidly the effects of a long voyage."

Veterinary Surgery in France.—The *Recueil de Médecine Véterinaire* (Paris) publishes some interesting statistical details on the present state of veterinary studies in France. There exist three schools of Veterinary Surgery, one quite near here, at Alfort, the second at Lyons, and the third at Toulouse. They include a total number of 665 students, 40 of whom belong to the army, and are supported by Government. Among the total number are 238 students, the expenses of whom are half paid either by the Government or Provincial departments. The cost of the three schools to the Government is about 663,000 francs annually, but as their receipts amount to 298,000 francs, the cost is in reality only about half that sum. To wind up, the *Recueil* states that the present state of the three Veterinary Schools is most flourishing, and that they maintain their high reputation.

Vulpian on the Nerves of the Iris.—The dilator muscle of the iris is, it is well known, under the influence of the sympathetic nerve. It has been hitherto believed that all its fibres are derived from the superior cervical ganglion of the sympathetic. Some recent observations of M. Vulpian, which he describes in the last number of the *Archives de Physiologie*, prove that we cannot regard this ganglion as their exclusive source. Experimenting upon dogs, he has removed altogether the cervical ganglion and adjacent part of the sympathetic trunk. Ten or twelve days afterwards, the animals having been put under the influence of curara until the motor nerves to the limbs had lost all their excitability, he applied strong-induced electrical currents to the skin of various parts of the body. Uniformly there resulted a slight, but distinct, reflex dilatation of the pupil on the side on which the sympathetic had been removed. Hence he concludes that some nerve filaments must reach the radiating muscle of the iris by some other path. Whether, as M. Aug. Voisin suggests, they pass up along the vertebral artery, or whether they are derived from the cranial nerves, is a question which remains to be decided.—*Lancet.*

THE VETERINARIAN, JUNE 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

THE ANNUAL MEETING OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

THE Thirty-first Annual Meeting of the Members of the Veterinary Profession was not numerously attended, and the proceedings were of a strictly formal character. No discussion took place on the Report; indeed, there was little room for discussion, as the chief subjects—the change in the system of Examination, the Building Fund, and the Juries' Bill—presented no points on which any great difference of opinion was likely to arise. While the scrutineers were engaged in examining the ballot papers, a conversational discussion took place among the members on the matter of veterinary education. Most of the speakers advocated something equivalent to an apprenticeship clause, which should insure the student getting a greater amount of practice in his profession before he obtains his diploma. Some difference of opinion was expressed as to the proper period for this practical work. One class of the speakers held that it should be passed through before entering the College; a second preferred that it should occupy a position between two periods of scientific study; and a third contended that the candidate should complete his College education, pass his examination, and then be placed under the charge of a veterinary surgeon for a year or more, at the end of which time he should receive his diploma.

It is doubtless interesting and important that the Council should be made acquainted with the views of the profession on all subjects; but, as the President explained, the Council cannot deal with the matter of education officially. Its powers are almost unlimited in respect of the examinations; but the Charter confers no power by which it can insist on the observance of a particular method of study. That the student should devote a longer time than is required of him at present

to the study of the science and practice of his profession, probably no one entertains a doubt; but before any important change in this direction takes place, the absolute need of it must be made apparent, and the new system of teaching be found unable to effect that at which it aims.

The Annual Dinner was held at the Albion Tavern in the evening, when about fifty members only attended. The smallness of the number was due, no doubt, to the circumstance that the President of the College was unable through indisposition to be present. He had conducted the business in the morning with much personal fatigue and suffering, and it was clearly seen at that meeting that the state of his health would not safely allow of his taking upon him the additional labour and risk of presiding over a convivial gathering in the evening.

The chair was occupied by the *ex-President,* M. J. Harpley, Esq., who well performed the duties devolving upon him. There was, however, a lack of spirit and pleasurable excitement about the whole affair. A cloud seemed to be resting on everybody and everything.

The education of the student again forced itself prominently forward in the remarks made by some of the speakers. One in particular—and a teacher too—spoke of things which ought to be done in this respect by the Council of the Royal College of Veterinary Surgeons, in a manner which would lead the meeting to conclude that the College was an educational and not merely an examining body. Our surprise at this was great, for it seemed to show that the speaker was either not acquainted with the provisions of the Charter, or that he had lost sight of the rights of the schools. We have always been found in the van, not in the rear of progress; but, at the same time, we have guarded with jealous care a perfect independence of action; and have resisted every attempt of the College to interfere with the educational arrangements of the school with which we are immediately connected.

An armed peace would now appear to be forcing itself into individual institutions, as it has long been doing into the councils of nations. Well, if it be so with regard to our profes-

sion, and contentions arise and strifes again begin, we intend not to be found unprepared. Peace, peace, is our cry—but not peace at any price. Our independence will be maintained, and, if necessary, at the heavy cost of unrelenting war.

GOVERNMENT INSPECTORSHIPS.

In our last issue we stated that information had reached us to the effect that two vacancies were likely to occur in the office of Port Inspector under the Veterinary Department of the Privy Council—one at Liverpool and the other at Thames Haven. We now learn that fresh appointments to these ports will be made forthwith, so as to come into operation at the end of the present month, and that arrangements are in the course of completion for the examination of candidates on the plan sketched in the last number of the *Veterinarian*.

We have authority also to state that the examination, of which information will be given to the candidates in due course, will be held about the 15th inst.

Candidates making application to the Veterinary Department will have sent to them a copy of the *Handbook*, which contains the Contagious Diseases (Animals) Act, Orders of Council, and the general regulations relating to the importation of animals into this country.

Extracts from British and Foreign Journals.

THE HARAS INSTITUTIONS OF FRANCE AND OTHER EUROPEAN COUNTRIES.

Of late years, there is no gainsaying it, France has become remarkably horsey. French sportsmen have not been satisfied with purchasing some of the best English blood, and accomplishing on their own turf unquestionable feats of good racing, but they have crossed the Channel with French-bred horses and won well-contested battles on English race-courses. Descending lower in the breeding scale, French draught horses imported direct from Normandy and Brittany are to be seen on most of the English farmsteads in the southern coun-

ties, and there are not wanting other tokens of a great movement on the part of the French with a view to improve as well as to increase their stock of horses.

The fact is that, owing to the comparative scarcity and consequent dearth of horse-flesh in England, and the state of ealousy resulting from the late war in Germany, the supply of horses to the French army has become both difficult and onerous. The necessity has arisen now to pay increased attention to native production, as the only reliable source of a supply, which, owing to the fearful destruction of war horses in 1870 and 1871, is the most serious cause of anxiety in the minds of those whose duty it is to reorganize the armies of France.

It cannot fail to be interesting to English readers to have an insight in the present state of horse breeding in France, and to be initiated to the great efforts which are now being made to increase, and, at the same time, to improve, the production of useful horses, especially of those breeds that are best adapted to war purposes, both as draught and saddle horses.

The French Government, with the view of improving the breeds of horses, has established an institution, which in England is exclusively left to private enterprise, but which in most of the Continental States either from lack of sufficient means or due attention, is a matter of absolute necessity as an immediate object of official interference, creation, and management. That institution is known under the name of *Haras*, which may be translated by the English word *stud*. That branch of civil service, which consists in the establishment and management of several stations all over France, where stallions of good blood are kept for the purpose of serving the mares of the districts, is rather a complex piece of administrative machinery. According to the new law which is to be voted shortly by the Assembly, and the substance of which I give, in preference to the existing one, as there is no doubt but it will be unanimously adopted, the Haras staff will comprise a director and general inspector, six general inspectors, twenty-two station directors, and as many sub-directors, besides a sufficient number of under-clerks to ensure the proper working of the department. There is besides a superior council of Haras,' the members of which will be appointed by the President of the Republic. Their number will be twenty-four, nominated for nine years. One-third will go out of office in rotation every three years, but all will be re-eligible to office. The duty of that board will be to give their advice on the annual Haras budget, on the

general regulations of shows and races, on the nature and importance of the encouragements to be given to horse-breeding, and all other questions that may be submitted to them by the Minister of Agriculture, to whose department they will belong, or by the director-general of Haras. It is further proposed that the number of stallions belonging to the State, and which is now only 1,077, shall be yearly increased by 200 until it reaches the effective quantity of 2,500. These stallions of various breeds and aptitudes will be divided among the stations according to the requirements of each district. It will be further enacted that the Haras school of Le Pin in Normandy shall be re-established, an imperial decree having some years ago closed it under the advice and influence of General Fleury.

Independently of the credits voted every year for the races, the grooming schools, &c., the present allocation of £27,320 affected to the payment of premiums to private owners of approved stallions will be raised to £32,000, and successively by additional yearly credits of £4000, until the total amount of credit affected to that object shall reach £60,000 a year.

We shall see presently how that money is now and will be applied.

It is in the last place proposed to re-establish at Pompadour, a Government estate situated in the neighbourhood of Limoges, in the centre of France, a breeding stud of fifty brood mares of Arab and Anglo-Arab blood. Formerly there was such a stud at Pompadour, but General Fleury, who was a most determined opponent to the Haras institution, prevailed on the late Emperor to do away with it, and it was closed accordingly. A herd of Shorthorns, the private property of the Emperor, was kept on the estate instead, which herd was sold after the downfall of its owner at Sedan.

The budget affected as ways and means to the Haras institution was of late years as follows:

1871	£141,100
1872	162,500
1873	164,840

With the view of increasing the number of State stallions from 1077 to 1300, the Minister of Agriculture had demanded for the current year an increase of £62,160, this sum being intended as the purchase price of the 223 additional stallions, the cost of their keeping and the wages to the extra staff of grooms to take care of them. Unfortunately the French Treasury is already too much drained by more pressing wants

to admit of that increase in the Haras budget and the finance committee of the Assembly, with the assent of the minister, have recommended that the budget of 1874 be the same as for last year, and do not exceed £164,840. Out of that sum, no less than nearly £40,000 are set aside for the purchase of stallions, not only to replace those that are worn out, but to purchase others.

The necessity of a carefully selected stud of well-bred stallions is a fact which no one can deny in any country, but especially in continental states like France and Germany, which are obliged to keep up large armies, and where the requirements for artillery trains and mounted cavalry are greatly in excess of those of the English army, for instance, taking the population, the area, and the stock of horses into consideration. In England the necessity of State interference does not arise, private enterprise, fostered by a national taste and powerful patronage from the wealthy classes, being quite adequate to all requirements. In France the circumstances are very different, and if the production of horses were left to private action, it would very soon descend to the lowest possible condition; for, even as it is, with the help of Government, and notwithstanding the powerful exertions of a body of influential horse-loving men, who, within the last few years, have started into existence, and have already achieved great feats in raising the standard of taste and anxiety to obtain it among French breeders, the production of good and sound horses in France is still at a low level, generally speaking, as will appear from the following figures: The number of brood mares in France is calculated at 600,000. Now, to serve that number of mares, there must be at least 12,000 stallions. We have seen that the number of stallions belonging to the State is only 1077, and it appears from the report of the finance committee that, besides that number, there were only 639 other stallions belonging to private breeders. This gives a total of 1716 good or commendable stallions, out of the 12,000 which must be used in France every year. This is, it must be confessed, a very small proportion, and it is owing to that deficiency that the existence of such an institution as that of Haras is not only useful, but it may be said indispensable. The Haras, then, have a double duty to perform; the first one is to supply a large number of well-selected stallions as a limited budget placed at their disposal will allow; and, secondly, to select out of private studs as many good animals as can be found to supplement their own deficiency. To that effect they hold out the strongest inducement they can to private breeders to exert themselves

in obtaining good blood, and to give easy and cheap access to it for all the mares of those districts where there are no State stallion stations.

There are two classes of stallions belonging to private breeders which receive the Government bounty on the recommendation of the Haras. There are those that are "approved," and which receive an annual bounty amounting to £36 if thorough-bred, and about £20 if only half-bred, provided they have served a certain number of mares in one season. There are others which are what is called "authorised." This latter qualification is only a recommendation to public confidence—a kind of official certificate of merit given by the Haras inspectors. Out of the 639 private stallions approved and authorised in 1873 there were only 216 authorised, out of which 42 were thorough-bred and half-bred; the 423 others were cart-horses.

From the foregoing facts and figures, on the accuracy of which there cannot be any doubt, it may be asserted that one-seventh only of the brood mares in France are served by commendable horses. The main bulk are left to the haphazard service of the rough lot of entire horses which prevail all through the country. It is a subject of general remark to Englishmen when they travel abroad, that most of the horses in ordinary use, either for draught or saddle, are entire, geldings being a very rare exception.

Under such circumstances it is no wonder the French Government should experience great difficulty in finding, among the 300,000 horses which France produces every year, even a fair proportion of the supply wanted for the army, and should consequently be under the necessity to make purchases in other countries.

Up to the last war the Algerian colony supplied a good number of light cavalry horses, but the drain has lately been so searching, coming especially after the famine of 1867-68, which destroyed 60 per cent. of the native live stock, that very few horses can now be obtained from Africa, and France is now compelled, notwithstanding her financial difficulties, to increase the Haras budget, with the view of promoting greater care in horse-breeding, and supplying to the wants of French agriculturists a much larger number of good stallions.

It has been calculated that the late war destroyed no fewer than 200,000 horses. It is easy to imagine, then, what are the difficulties encountered by the War Office in repairing such a fearful gap. On the other hand, the facilities which existed formerly in obtaining a supply of horses in Germany and Hungary have been greatly hampered by late events, not

only on account of international jealousy and animosity, but also on account of the great destruction of horses which occurred among the invading German hosts, their victory notwithstanding.

In 1871 the sum proposed in the Haras budget for the purchase of stallions was £20,000; the assembly voted £23,400 for that object. Last year that amount was raised to £89,200, aad the same amount is proposed for 1874. This is all the exhausted exchequer of France can possibly afford, notwithstanding the pressing needs of a better and more prolific horse production.

It would appear from the statistics I have quoted that only one half of the brood mares served in France brings forth and rears a colt. This seems a small per-centage, and surely some improvement is desirable in that respect.

A glance at the existence of similar institutions in other Continental states will be useful as terms of comparison This will account for the greater number of useful horses to be found in Russia, Germany, and neighbouring States than in France, the area and population being considered.

In the year 1869 the late Emperor of the French appointed a committee of competent men to go and inquire about the various State Haras establishments in Russia, Prussia, and other German states, Austria, and Hungary. This committee published their report, from which I abridge the following information:

Prussia.—Before the battle of Sadowa there were in Prussia three Haras stations—those of Neustadt, Graditz, and Trakenem, in which 2,100 brood mares and 322 stallions were kept. The State possessed, besides, thirteen minor stations, scattered throughout the kingdom, containing, in all, 1500 stallions, making a total of 1823 horses and 2100 brood mares.

Wurtemburg.—In the kingdom of Wurtemburg there are two Haras, those of Shamhausen and Marbach, in which 110 stallions and brood mares are kept.

Saxony.—The kingdom of Saxony possesses only one Haras, in which no less than eighty stallions are kept. The establishments of Hanover, Holstein, and Mecklenburg were not visited by the French committee, but from the official information they obtained they were able to ascertain that throughout the various States now forming the empire of Germany there were, at the time of their visit, no less than 4000 stallions belonging to the States, besides those kept by numerous private breeders and large landed proprietors.

Empire of Austria.—In Austria proper there are four

principal Haras: first, that of Piber, in Styria; second, that of Radautz, in Buckowine; third, that of Kladrub, in Bohemia; and fourth, the Haras of Lipitza, near Trieste. The two first establishments are by far by the most important. That of Radautz possesses no less than 5000 horses. The two latter contain each about 60 stallions and 350 brood mares. Besides the above four breeding Haras the empire of Austria has in its different provinces five other stations, in which 1500 stallions are kept.

HUNGARY.—The kingdom of Hungary is, perhaps, the country of the world in which most horses are bred, the area and the population being considered. In 1869 there were in Hungary no less than upwards of two million horses, which gives one horse for every five inhabitants. In France there is only one for every ten inhabitants. The State keeps in Hungary three great Haras establishments; first, that of Kisberg, where chiefly pure English blood horses are bred. Out of 220 brood mares there are 58 of pure English breed. The second is situated at Babolna, and is specially reserved for the breeding of pure Arab horses. There were in 1869 ten stallions and sixty-six brood mares of pure Arab blood, besides eighty-four half-bred mares. The third Hungarian Haras is the celebrated one of Mezoheges, near the town of Arad, at a distance of about 180 miles from Pesth. This is by far the most complete and the largest stud establishment in Europe. The estate itself comprises no less than 44,640 acres, in a ring fence, and the number of horses kept varies between 3000 and 7000 at the same time. There are thirty-four stallions of pure English and Arab blood, half-bred English, Anglo-Norman, and Anglo-Arab breeds, for serving the large stock of brood mares. This great establishment turns out every year from 130 to 150 first-class stallions, which are afterwards sent off to the various stations of the whole empire of Austria. Besides these three large breeding establishments there are in Hungary four stallion stations, possessing, in the aggregate, 1500 horses. In a country where horse-breeding is so powerfully patronised it is not surprising to find that most of the large landed proprietors follow so great an example, and that the national taste is thoroughly biassed in that direction. Nearly all the great aristocratic families follow horse-breeding as a noble pursuit, and derive pride and gratification from the splendour of their studs. Among these powerful private stud establishments of Hungary, those of Counts Karoly, Esterhazy, Paffy, Duke of Coburg, Archduke Albrecht, Baron Simon Sina, &c. &c., are the most remarkable. Some of these private studs consist of no less than five hundred horses.

Russia.—There are in Russia twenty million horses. The number of stallions kept at various stations throughout the empire amounts to at least 6000. There are, besides, a great many private studs of great importance, and Government was still increasing the number of the stations and that of the horses.

This state of things shows how inferior France is to her neighbours in respect of horse-breeding, whilst in point of natural resources suited to the production of good horses she is second to no country in the world. Now her statesmen are compelled, by a dire necessity, to look closely into these branches of her economy; they may see how shallow was that appearance of prosperity and power which the enervating reign of the late emperor had laid over all her interests, both moral and material. At the first touch of a stern reality the whole fabric collapsed into a heap of ruins, and the people are now amazed at the rottenness of the props that kept it up. The work of those who have assumed the patriotic task of restoring the former grandeur of France on more solid grounds is, indeed, one of unexampled difficulty. Let us hope, for the sake and credit of our common humanity, that success will ultimately reward their almost hopeless efforts.—*Mark Lane Express.*

CONTAGIOUS DISEASES IN ANIMALS.

[Deputation to the Government.]

On Friday, May 23rd, a deputation from the Council of the Central Chamber of Agriculture waited upon the Duke of Richmond, as President of the Council, to urge the importance of giving effect to the views of the Chamber respecting the prevention of contagious diseases in animals. The deputation comprised Lord Hampton, Mr. C. S. Read, M.P., representing the Norfolk Chamber; Mr. Neville-Grenville, M.P.; Mr. Storer, M.P.; Mr. G. T. Muntz, Chairman of the Central Chamber; Mr. W. Stratton, South Wiltshire; Mr. T. Duckham, Herefordshire; Mr. T. Willson, Leicestershire; Mr. J. Yolland, West Gloucestershire; Mr. J. Odams, Central Chamber; and Mr. Algernon Clarke, the secretary, &c.

Lord Hampton, in introducing the deputation, said that the Chambers felt very great dissatisfaction at the conclusion to which the Committee of the House of Commons arrived with respect to this subject; and their object was to impress upon his Grace the desirability of some alterations being made in the law as it affected the importation of cattle from abroad.

Mr. Muntz handed to the Duke a copy of the committee's report, and said that great fears existed in the minds of many farmers in consequence of the want of protection that was now given to their herds and flocks, and because they believed the cattle disease might again be brought into this country from abroad, especially from Ireland and other places to which the slaughtering powers of the late Act did not apply. As long as these fears existed, the country could not expect a large increase in stock-growing, for the agriculturists would naturally prefer cereal crops to rearing and feeding cattle. Thus the farmer and the consumer would be materially injured, and the present high prices of meat inevitably be continued.

Mr. C. S. Read, M.P., said that the answer given to the question put by Sir R. Buxton in the House of Commons as to whether the Privy Council would rescind the order which directed that cattle affected with pleuro-pneumonia should be slaughtered in Great Britain, was not at all satisfactory to the Chambers. He was sure that such an order would have no appreciable effect in stamping out the disease, unless it was applied equally to Ireland, from whence large numbers of store cattle were constantly imported. The committee also thought that the time of isolation should be extended from one month to two to those cattle that had been herded with diseased animals, and they suggested that, in order to encourage early notices being given by owners of stock, and to enlist their sympathies in carrying out the act, the compensation should be at the rate of three fourths of the loss, instead of one half of the value of cattle as was now allowed by law. (*A Voice:* Up to £20.) The Privy Council had ordered the slaughtering powers to be enforced, without extending them to Ireland, or without increasing the time of isolation, or the amount of compensation, and this was the grievance of which the agriculturists had to complain. The manner in which cattle were brought over from Ireland tended to induce disease, and this was another matter which, in his opinion, required the serious attention of the Government.

Mr. Storer, M.P., Mr. W. Stratton, Mr. Duckham, Mr. Willson, Mr. Yolland, Mr. Odams, and other gentlemen, having detailed their experience, and urged the importance of infected cattle being slaughtered at the port of debarkation,

The *Duke of Richmond* said it would be impossible for him not to recognise the great importance of the Chambers of Agriculture and the value of the report which had been handed to him that day. The desirability of preventing the spread of disease in cattle must suggest itself to everybody, but, at the same time, he could not disguise from the deputation this fact, that the views which they entertained were not held entirely by other classes of

the community, for deputations had waited upon him whose views were very much divided upon the subject. It did not follow, however, that the necessity did not exist for the Government to look fully into the question, and to see how far the introduction of disease could be prevented. Now, with regard to Ireland, the power to slaughter animals suffering from pleuro-pneumonia, and to compensate, existed at the present moment; and therefore he could not see what more the Legislature could do in that matter. With respect to foot-and-mouth disease, the report of the committee of the House of Commons which sat last year went rather further than some of the deputation seemed to desire. The gentlemen had stated that, as suggested by the committee, the farmers would be ready to undergo any amount of inconvenience in order to put down the disease; but the committee went further than that, and said that to cope with the disease nothing but the most stringent measures would be of any avail; that it would require a costly and numerous staff of inspectors, an amount of supervision that would cause much local opposition, and such an interference with the home trade in animals that would lead both producer and consumer seriously to consider whether the remedy would not be worse than the disease. The committee sat for a considerable period, and examined a great number of witnesses, and their opinion was certainly entitled to the greatest consideration. There was another point which he knew had prevailed for some time amongst many agriculturists, and that was that all fat cattle ought to be slaughtered at the ports of debarkation. The subject was discussed about three years ago at the dinner of the Royal Agricultural Society, and at the Smithfield Club, and in that there was also a difference of opinion. It was said by the committee that the same witnesses representing the agricultural interest had urged that all fat animals that were imported from abroad should be slaughtered at the port of landing, and that foreign store stocks should also be slaughtered or subjected to quarantine. On the other hand, they said that strong representations had been made by butchers and dealers that such an order would discourage importations, and tend to raise the price of meat in the various towns. Therefore the committee came to the conclusion that no change should be made in the Act which related to foreign animals; but they recommended the Privy Council to continue their order for the slaughtering of all animals that came from places where the disease existed, or from whence it was feared it might be introduced. If cattle were landed from places that were scheduled, then it was imperative they should be slaughtered at the port, but not otherwise. He was not certain that the public were not benefited by this rule, but at the same time he did not wish the

deputation to think that he had drawn any foregone conclusion in the matter. To take a step as proposed would require very great consideration on the part of the Government, and it might be difficult for those who made such rules to see them carried out. He was fully aware of the vast importance of their flocks and herds being kept free from disease, for probably he should be as large a sufferer as any gentleman present, if unfortunately it should get amongst his stock; therefore, he saw the question from an agricultural as well as from a departmental point of view. As he was thus so very intimately identified with the agricultural community, he thought they might understand that anything he should do in his department would not be otherwise than for the benefit of the public, as also for that of the farmers generally. He had been told that there was no Order in Council that required the slaughter of affected animals in Ireland, but, certainly, he himself carried a bill which enabled the Government to find money wherewith to compensate those parties whose cattle were destroyed in that country.

Mr. Willson said he had been informed by Earl Spencer that the Government could not pay compensation in Ireland.

The *Duke of Richmond:* No, not then; but the bill he referred to enabled them to give compensation afterwards.

The deputation then withdrew.

Analysis of Continental Journals.

By G. Fleming, M.R.C.V.S., Royal Engineers.

CURE OF A CASE OF TRAUMATIC TETANUS.

In the *Gazetta Medico-Veterinaria* for the present year (p. 46), Grilli Federico, veterinary surgeon in the Italian army, describes a case of traumatic tetanus which was successfully treated. The horse was a half-bred English animal, and the disease was due to a punctured wound at the base of the frog, produced by a street-nail. There was nothing unfavorable in the injury, and the horse had nearly recovered when, on the fifteenth day, trismus set in, and the whole body was soon involved in tetanic convulsions.

The symptoms were very intense, and the temperature ascended to 103° and subsequently to 104°. The treatment consisted in the administration of muriate of morphia, intro-

duced by injection into two subcutaneous pouches, formed by a seton-needle in the masseteric region. The quantity injected each day at various periods was a gramme of the alkaloid in fifty grammes of distilled water. A liniment, composed of spirits of turpentine and liquor ammoniæ, was rubbed into the skin over the dorsal region, and enemas of soap and water, each containing twelve grammes of laudanum, were frequently given. Repeated fomentations with hot-water vapour (*replicate fomentazioni di vapori acquosi*), and the inhalation of chloroform and sulphuric ether, were also prescribed. The place in which the animal was lodged was kept at a moderate temperature, and was otherwise well adapted for the recovery of the patient, whose body was covered with a light woollen rug. This treatment was continued for three days, at the termination of which the animal was better; the muscular tension had diminished, the respiration was perceptibly relieved, and the jaws could be separated to a distance of two fingers' breadth. With this amelioration in the symptoms, the animal gave evidence of relief by frequently drinking oatmeal gruel, with which large doses of tartar emetic and nitrate of potash had been mixed. Continued for ten more days, this treatment gradually brought about a marked amendment. On the twenty-fourth day from the receipt of the injury, and the thirteenth of medical treatment, the medicines hitherto administered were discontinued, and eight grammes daily of bromide of potassium, with enemas now and again, and dry frictions, were substituted until the thirtieth day. At this time the animal began to eat slowly of bran mash and soft bread, and afterwards damped forage, but it was not until two months from the commencement of convalescence that recovery was complete.

OSTEOPOROSIS.

Osteomalacia, or, more properly speaking, perhaps, *osteoporosis* (one of the forms of "hyperostosis," so designated by Lobstein), appears to be attracting some attention; though whether this is due to its becoming more prevalent than formerly, or because it is more carefully reported, it would be somewhat difficult to say. Certain it is that its manifestation in the equine species has been noted in various parts of the world in recent times, and one of the latest reports is that from Berne, Switzerland (published in the 'Zeitschrift de Berne,' for 1873), where it has been affecting horses in a serious manner. It has been investigated by Pauli, Jæhr, Stuber, Wysman, Anacker, Putz, and others—veterinary professors and practitioners,—who seem to have attributed its de-

velopment to the too abundant and almost exclusive use of bran as food. It more particularly affected millers' horses, which, by feeding on bran, become gross and fat, but are otherwise heavy and sluggish. After being kept for some time on this diet the digestive process is impaired, intestinal catarrh, colic, and derangements of the urinary apparatus are observed; and, ultimately, this special disease of the bones, which is more particularly localised in those of the limbs, difficult to remedy when it has appeared, but which may nevertheless be prevented by adding a reasonable proportion of hay and oats to the bran diet. Pauli asserts that several millers have lost three or four of their best horses within a year from this disease.

The malady commences with sudden lameness, and if a fore limb is affected, it has the symptoms of a shoulder sprain or rheumatism in that region—if a hind limb, which is most frequent, it then resembles hip lameness. The limb is slowly elevated and rather dragged than lifted, progression is impeded, and the foot is put as softly on the ground as if the animal walked on eggs. At the commencement no tumefaction is perceived, neither is there any increase of temperature nor pain on manipulation of the diseased limb; later, however, according to Jæhr and Stuber, there is considerable engorgement of the articular eminences, especially of the carpal and tarsal articulations, which are then a little hot and painful, though there is no arthritis. There is also observed a special engorgement of the bones of the head, chiefly the superior and inferior maxillary bones, preceded by great difficulty in mastication, which increases as the disease becomes more developed, until the animal can scarcely seize a mouthful of forage, and must be kept alive on soup or thick gruel. Wysman has witnessed cases in which the jaws could not be closed, the molar teeth being wide apart, and the symptoms altogether not unlike those of trismus. The patient could no longer feed properly, became feeble, was scarcely able to stand, and when lying, could only with great difficulty get up again; progression was unsteady and painful. All kinds of treatment—tonic, restorative, analeptic—were useless if the diet was not altered at an early period. After death the muscles were found to be pale and softened, the bones porous, tumified, and fragile; in the long bones the medulla was fluid and brown-coloured. It was noticed in some cases that the molars were loosened in their alveoli and shook about. Pulz is about to publish the result of his microscopic examination of the bones.

Zundel, who comments on this outbreak, reminds us that

Cornevin has published in the 'Recueil' an account of a special lameness due to giving oil-cake too abundantly to animals.

Varnell's description of some cases of osteoporosis which he observed at Reading—the horses also belonging to a miller, who fed them chiefly on bran or pollards—('Veterinarian' for 1860, pp. 493, 573, 645), do not appear to be known to our *confrères* in Switzerland, neither is the general literature of the malady noticed by them.

EXPULSION OF TAPEWORM.

Laboulbène recommends macerating in two glassfuls of pure water for twenty-four hours, sixty to ninety grammes of pomegranate of Portugal. At the end of this time it should be evaporated by a gentle heat, then at a higher temperature, until reduced to one glass. The remedy acts on the Tænia by causing it to let go its hold; as soon, therefore, as the patient (human, of course) experiences uneasy sensations in his abdomen, as of something moving or curling up, the physician should immediately give him from thirty to one hundred grammes of castor oil, in one, two, or three doses. A curious fact observed by Laboulbène was that of an individual who passed a living tapeworm spontaneously during a fit of drunkenness. The alcohol had acted as a stupefiant to the parasite, and caused it to loose its hold.

Bertolus had already in 1864 noticed that the inhalation of ether by dogs rendered the tapeworm torpid, and that it was then spontaneously expelled alive, or after a slight purgative had been administered. Lortet, assistant to Bertolus, as the result of these experiments, recommended for the treatment of Tænia in man the administration of a substance capable of stupefying the parasite in the intestine, and soon afterwards an oily or saline purgative. He prescribed sixty grammes of the syrup of ether to be taken as a single dose, and in two hours thirty grammes of castor oil. In five cases the worm was expelled entire without any suffering being occasioned.—*Gazetta Méd. de Lyon*, 1864.

HERTWIG'S FIFTIETH PROFESSIONAL ANNIVERSARY.

On the 29th October last, the fiftieth anniversary of Hertwig's professorship in the Berlin Veterinary School was celebrated by the veterinary and medical professions in that city with unusual festivity. The event was rendered still more pleasing to the distinguished teacher of veterinary science by

the Prussian Government conferring upon him, through the medium of a high authority, the Cross of Officer of the Order of the Red Eagle.

VETERINARY INSTITUTE OF VIENNA.

Professor Röll, Director of the Imperial Veterinary Institute of Vienna, has received the Cross of the Second Class of the Order of Saint Anne, Russia.

Professor Pillwax, of the same school, died at the end of November last, aged fifty-nine years. He was a man of high scientific attainments, a doctor of medicine, and author of some excellent contributions to professional literature.

ROYAL COLLEGE OF VETERINARY SURGEONS.

ANNUAL MEETING, HELD MAY 4TH, 1874.

Professor BROWN, President, in the Chair.

THE thirty-first annual meeting of the members, politic and corporate, of the Royal College of Veterinary Surgeons was held by advertisement, and in accordance with the provisions of the charter, on the first Monday in the month of May, being the fourth day thereof, 1874, at the College, 10, Red Lion Square, Holborn.

Present.—The President, Professor Brown; Professors Pritchard, Williams, Fearnley, and Assistant-Professor Axe; Col. Sir F. Fitzwygram, Bart.; Messrs. W. C. Bland, J. C. Broad, Alf. Broad, Jn. Brown, Thos. Burrell, B. Cartledge, H. J. Cartwright, J. J. Cheesman, Jas. Cowie, Jos. Davies, C. Dayus, W. Death, E. C. Dray, Wm. Field, junr., Geo. Fleming, D. Gibbon, J. M. Gillingham, G. J. Gould, T. W. Gowing, T. W. Gowing, junr., Thos. Greaves, Jas. Hall, H. J. Handcock, M. J. Harpley, W. Helmore, Jn. Howard, R. L. Hunt, W. Hunting, F. Jarvis, J. T. King, H. Lawrence, H. G. Lepper, T. W. Mayer, Jas. Moon, Jas. Moore, Jas. Moore, junr., Thos. Moore, J. W. T. Moore, G. Morgan, G. A. Muir, M. E. Naylor, A. J. Owles, W. Pallin, W. Partridge, W. Roots, A. G. Ross, Jas. Rowe, junr., C. C. Sanderson, W. B. Spooner, F. T. Stanley, T. W. Talbott, Jn. Tatam, W. Wilson, S. H. Withers, Jos. Woodger, Jos. Woodger, junr., F. W. Wragg, and the Secretary.

The Secretary read the notice convening the meeting.

The minutes of the last general meeting were read and confirmed.

The Secretary then read the Annual Report.

REPORT.

The Council of the Royal College of Veterinary Surgeons have to report that at the Annual General Meeting, which was held on May 5th, 1873, in accordance with the provisions of the Charter, Messrs. M. J. Harpley, R. Pritchard, J. W. Axe, B. Cartledge, J. Woodger, Jun., and Jas. Moore, were elected Members of the Council, in place of those who retired by rotation.

At the first Meeting of the Council, held May 27th, Professor Brown, of the Royal Veterinary College, was elected President, and the following gentlemen were elected Vice-Presidents:—Professor McCall, Messrs. Withers, Mayer, Naylor, Field, and Lowe; Treasurer, Mr. S. H. Withers; and Secretary, Mr. W. H. Coates.

The amended Bye-laws, which were brought before the members of the profession at the last Annual Meeting, came into operation in 1873, and the Council were advised that the effect of Bye-law 19 was to dissolve the Board of Examiners. Accordingly, at the meeting which was held on June 10th, 1873, the following gentlemen were elected to constitute the Court of Examiners:

DIVISION FOR ENGLAND.

A. S. Taylor, Esq., M.D., F.R.S.	G. Fleming, Esq., M.R.C.V.S., F.R.G.S., Royal Engineers.
W. Sharpey, Esq., M.D., F.R.S.	R. L. Hunt, Esq., M.R.C.V.S.
Professor Voëlcker, F.R.S.	M. J. Harpley, Esq., M.R.C.V.S., Royal Horse Guards.
Professor Birket, F.R.C.S.	W. Field, Jun., Esq., M.R.C.V.S.
Professor Bentley, M.R.C.S.	
Rd. Pritchard, Esq., M.R.C.V.S.	

T. W. Mayer, Esq., M.R.C.V.S.

DIVISION FOR SCOTLAND.

Jas. Dunsmure, Esq., M.D., F.R.C.S.	B. Cartledge, Esq., M.R.C.V.S.
Alex. Crum-Brown, Esq., M.D., F.R.C.P.	Wm. Robertson, Esq., M.R.C.V.S.
Allen Thompson, Esq., M.D.	R. B. Paterson, Esq., M.R.C.V.S.
Professor Turner, M.B., F.R.C.S.	Alex. Robinson, Esq., M.R.C.V.S.
Professor Dickson, M.D.	Daniel McLean, Esq., M.R.C.V.S.
	Chas. Tennant, Esq., M.R.C.V.S.

The result of the new system of examination, so far as it has been tested, has proved in every respect satisfactory.

At the meeting of Council which was held in October communications were read from Her Majesty's Secretary of State, Home Office, respecting an application from Professor Williams, Principal of the New Edinburgh Veterinary College, for a Royal Warrant to affiliate his College to the Royal

College of Veterinary Surgeons. The application was opposed by the Edinburgh Town Council. After due deliberation it was resolved, "That the Council do not object to the granting of Professor Williams's application."

At the meeting which took place in January last an attested copy of the Royal Warrant was laid before the Council and accepted by them as legal evidence of the affiliation of the New Veterinary College to the Royal College of Veterinary Surgeons.

Under the new Bye-laws no provision existed for the Special Examination which had previously been allowed in the case of holders of the Highland and Agricultural Society's Certificate. The question of the expediency or otherwise of continuing this privilege was considered by the Council, and it was unanimously resolved that it should be discontinued.

With reference to the Juries Bill, which was alluded to at the last Annual Meeting, the Council have to announce that in June, 1873, a telegram was received from Hart Dyke, Esq., M.P., addressed to the late President, M. J. Harpley, Esq., informing him that Col. Barttelot's amendment was carried without a division, viz. in Clause 5, line 24, after "respectively," insert "also members of the Royal College of Veterinary Surgeons actually in practice."

Mr. Harpley thereupon addressed the following letter in reply:

REGENT'S PARK BARRACKS,
5th June, 1873.

MY DEAR SIR,

I cannot tell you how grateful I am for your kindness in causing the members of my profession to obtain the boon they have been trying for for years, viz. "Exemption from serving on Juries." To you and Col. Barttelot every veterinary surgeon holding a diploma of our College ought to consider himself under a lasting obligation.

Setting aside the fact that our duties to the public are of such a nature that we might have reasonably hoped from that cause to have been considered entitled to exemption, there is another point gained which will give greater vitality to the veterinary profession, and that is, that our exemption will be a death blow to quackery, as certificated members alone are freed from the operation of the Juries Act. I should be much pleased if you would tell Col. Barttelot how thankful we all are to him for taking up this subject. I thus hurriedly write a few lines in gratitude for your labours in our cause.

(Signed) M. J. HARPLEY.

The Council unanimously awarded a vote of thanks to Mr. Harpley for his great exertions towards securing to members of the Royal College of Veterinary Surgeons the exemption from serving on juries. Unfortunately, however, at the end of the session of Parliament, and after considerable progress had been made with the Bill in Committee, the Government found it impossible to proceed further, "and after much opposition the Attorney-General announced his intention to withdraw the Bill, and the order was accordingly discharged." However, the Council have the satisfaction to announce that in the Juries Bill which is now before Parliament, prepared and brought in by Mr. Lopes, Mr. Gregory, and Mr. Goldney, the clause which will exempt veterinary surgeons from service is duly inserted.

During the past year the College Fund Committee have used their utmost efforts to raise a sufficient sum to enable the Council to obtain more suitable premises than those at present occupied by the College.

The subject has been brought prominently before the attention of the members of the profession throughout the United Kingdom, by circulars which have been issued at different periods. The first circular explained the object of the Fund, and requested each member to take action in the matter, and also suggested the appointment of provincial committees, for the purpose of obtaining subscriptions. The second circular contained a list of subscribers, many of whom had responded to the appeal in a very liberal manner. The subscriptions, up to the present date, amount to £966 4*s.* 7*d.*

At the termination of the present year the lease of the College premises will expire; the Council will have to incur an increased rental, amounting to £100 per annum, independently of the outlay for necessary repairs.

At the last Meeting of Council, on April 8th, it was resolved that a record be kept of the attendance of the members of Council at the several meetings held during the course of the year, and also that the record be embodied in the Annual Report. In compliance with this resolution the Council have to submit the following

Statement of attendance of Members at the Council Meetings held during the year 1873–74.

VICE-PRESIDENTS.

James McCall	2	Martin E. Naylor	5
Samuel H. Withers	5	William Field, Jun.	4
Thomas W. Mayer	1	Clement Lowe	3

COUNCIL.

Matthew J. Harpley	7	James B. Simonds	5
Richard Pritchard	1	Francis R. Silvester	1
John W. Axe	5	James C. Broad	3
Benjamin Cartledge	3	Thomas Burrell	4
Joseph Woodger, Jun.	6	Edward C. Dray	7
James Moore	7	George Balls	3
William Williams	3	John Wilkinson	3
George Fleming	4	James Moon	4
William Pritchard	5	William Henry Coates	7
Thomas Greaves	3	Thomas W. Gowing	3
Robert L. Hunt	3	Thomas D. Broad	2
George T. Brown	6	James Cowie	4

The Council have to report that during the past year 113 pupils, from the different schools, have received the diploma of the Royal College of Veterinary Surgeons. Two others have availed themselves of the Special Examinations, thus making a total of 115 members who have been admitted into the Body Corporate.

The Registrar has to report the death of thirty-three members of the profession since the last Annual Meeting. Among those whose loss is most deeply regretted by the Council and the profession is Mr. Francis Robert Silvester, of St. Alban's, Herts. He was elected President of the Royal College of Veterinary Surgeons in 1861, and officiated as a Member of the Council during a period of twenty-three years.

The Annual Register of the Royal College of Veterinary Surgeons has been published, and is issued gratuitously to members of the profession on application to the Secretary.

During the past year a Library Committee has been appointed and several books of recent publication have been purchased as works of reference, and placed in the Library. The following valuable presentations have been made, viz. a work entitled 'Veterinary Papers,' by the late Professor Dick, presented by Miss Dick; 'Horses and Stables,' by Col. Fitzwygram, presented by G. Fleming, Esq., F.R.G.S., Royal Engineers; 'The Internal Parasites of our Domesticated Animals,' by Dr. T. S. Cobbold, F.R.S., Professor in the Royal Veterinary College, London; the second edition of 'The Pharmacopœia,' by Professor Tuson, F.C.S., Royal Veterinary College, London; and 'The Therapeutic Action of Drugs,' by Messrs. Burness and F. J. Mavor, London.

The Central Veterinary Medical Society renewed their application to the Council of the Royal College of Veterinary Surgeons for the use of the Board Room to hold their Meetings, which was granted.

The Financial Report is annexed. The balance in hand, after defraying the expenses of the year, amounts to £277 0*s.* 6*d.*

S. H. WITHERS, TREASURER, *in Account with the Council of the Royal College of Veterinary Surgeons,*
From APRIL 1*st*, 1873, *to* MARCH 31*st*, 1874.

Dr.

	£	*s.*	*d.*
Balance at Bankers', April, 1873	250	6	10½
Examination Fees to March 31st, 1874	1,108	16	0
Interest on Deposit Account	2	9	5
Dividends	18	19	10
Registers	0	7	0
Property Tax	0	15	0
Gas consumed by C.V.M. Soc.	1	17	6
	£1,383	11	7½

Cr.

	£	*s.*	*d.*
Examiners' Fees and Expenses	583	6	6
Building Fund, Transfer of Account & Interest	64	17	1
Rent	60	0	0
Rates and Taxes	35	14	4½
Salary to Secretary	150	0	0
Insurances	1	18	9
Advertisements	8	19	9
Printing	53	4	0
Bookbinding and Books for Library	9	2	0
Copying Press and Appurtenances	6	4	8
Stationery and Postage Stamps	31	6	6
Reporters	11	0	6
Coals, Gas and Wood	23	14	3
Law and Parliamentary Agents	10	8	10
Drugs and Chemicals	2	9	6
Repairs	8	17	11
Wages	20	0	0
Petty House Expenses	25	6	6
Balance at Bankers'	277	0	6
	£1,383	11	7½

Amount of Stock standing in the names of the Trustees £640 19 11, Three per cent. Consols.
We, the undersigned, have examined the above accounts, and have found them correct.

April 17, 1874.

HARTLEY THOMAS BATT,
RICHARD SKELTON, } *Auditors.*

COLLEGE FUND.

The following List of Subscribers to the Fund for Building or purchasing suitable premises for the offices of the College is complete to the present date, April 30th, 1874.

	£	s.	d.
Donation originally given by T. W. Mayer, Esq., in 1849	37	14	7
Interest thereon	27	2	6
Adlard, J. E., Esq., London	1	1	0
Anonymous, by M. J. Harpley, Esq.	5	5	0
Axe, J. W., Assist.-Professor, R.V.C., London	2	2	0
Axe, Joseph Machin, Esq., Doncaster	1	1	0
Balls, Messrs. G. and Son, Brixton	21	0	0
Barford, John Davis, Esq., Southampton	2	2	0
Barker, William, Esq., Middlesborough	2	0	0
Batt, Hartley Thos., Esq., London	10	0	0
Bentley, William, Esq., Margate	1	1	0
Broad, James C., Esq., London	10	0	0
Broughton, William, Esq., Leeds	2	2	0
Brown, G. T., Professor, R.V.C., London	20	0	0
Brown, John, Esq., London	2	2	0
Burrell, Messrs. T. and Son, London	10	10	0
Carless, Messrs. J. and Son, Stafford	2	0	0
Carter, Joseph Shepherd, Bradford	2	2	0
Cartledge, B., Esq., Sheffield	21	0	0
Cartwright and Hill, Messrs., Wolverhampton	50	0	0
Cave, George, Esq., Liverpool	5	5	0
Cheeseman, John Jas., Wandsworth	5	0	0
Child, James, Esq., Hackney	5	0	0
Coates, W. H., London	5	0	0
Coleman, Edward, Esq., London	2	2	0
Collins, Jas., Esq., Staff V.S., Dublin	5	5	0
Constant, S. P., Esq., 5th Dragoon Guards, Dundalk	5	5	0
Cooper, William, Esq., Berkhampstead	5	5	0
Cope, Alexander C., Esq., London	5	5	0
Cox, John Roalfe, Esq., London	10	0	0
Cuthbert, John, Esq., Leeds	2	2	0
Death, William, Esq., Army Service Corps, Aldershot	1	1	0
Dray, E. C., Esq., Wandsworth	5	0	0
Farrow, Wm. Hastings, Esq., London	5	0	0
Field, William, Esq., jun., London	100	0	0
Fitzwygram, Col. Sir F. W., Bart., London	210	0	0
Fleming, G., Esq., Royal Engineers, Chatham	5	5	0

	£	s.	d.
Freeman, James, Esq., Hull	1	10	0
Freeman, John, Esq., Hull	1	10	0
Freeman, Joseph, Esq., Keyingham, Hull	1	10	0
Gowing, Messrs. T. W., and Son, London	10	0	0
Greaves, Thomas, Esq., Manchester	20	0	0
Gregory, John B., Esq., Portsmouth	2	12	6
Hammond, John, Esq., Bale, Norfolk	1	1	0
Harpley, M. J., Esq., Royal Horse Guards	5	5	0
Howard, Richard, Esq., Thetford, Norfolk	1	1	0
Hunt and Parker, Messrs., Birmingham	50	0	0
Kennedy, Thomas, Esq., Wrexham	1	0	0
Kent, W. H., Esq., London	5	5	0
Lambert, John, Esq., 17th Lancers, Dublin	2	0	0
Lawson, Alexander, Esq., Manchester	5	5	0
Lepper, Messrs. H. and G. A., Son, Aylesbury	10	0	0
Longman, Geo., Esq., Cavalry Depôt, Canterbury	2	2	0
Lowe, Clement, Esq., London	2	2	0
Malcolm, John, Esq., Enniscorthy	2	2	0
Mavor, William, Esq., St. Leonard's-on-Sea	10	0	0
Mavor, Messrs. Alexander and F. J., London	50	0	0
Merrick, Thos. Jas., Esq., Northampton	5	5	0
Moon, James, Esq., Kingston-on-Thames	5	0	0
Moore, James, Esq., London	5	0	0
Moss, Michael, Esq., Sittingbourne, Kent	1	1	0
Naylor, M. E., Esq., Wakefield	10	0	0
Olver, Harry, Esq., Tamworth	1	1	0
Olver, Thomas, Esq., Truro	1	1	0
Overed, J. D., Esq., Blofield, Norfolk	2	2	0
Owles, Alfred J., Esq., Staff V.S., Aldershot	1	1	0
Pearce, J. H., Esq., Whitchurch, Hants	1	0	0
Peele, Henry, Esq., West Hartlepool	2	2	0
Ritchie, James, Esq., Gateside, Kincaldrum	5	0	0
Robertson, James, Esq., Kelso, Roxburghshire	3	3	0
Roots, William, Esq., London	2	2	0
Simonds, J. B., Professor, Principal R.V.C., London	30	0	0
Smith, William, Esq., Norwich	5	0	0
South, George, Esq., London	5	5	0
Taylor, James, Esq., Colchester	3	3	0
Thomson, George, Esq., Horncastle	1	1	0
Wallis, W. S., Esq., Halstead	2	2	0
Wells, Thomas, Esq., Beacondale, Norwich	1	1	0
Withers, S. H., Esq., London	5	0	0
Withers, Henry, Esq., London	1	0	0
Withers, Alfred, Esq., London	1	0	0

	£	s.	d.
Woodger, Joseph, Esq., London	10	10	0
Woodger, Joseph, Esq., jun.	10	0	0
Yorkshire Veterinary Medical Society	50	0	0

A gentleman has offered to give £100 towards the fund on condition that nine other members of the profession will subscribe not less than £100 each. Or the same gentleman will give £50, provided that nineteen others will subscribe a sum of not less than £50 each for the same purpose.

Mr. Dray proposed "That the report be received."

Mr. Helmore seconded the motion, which was agreed to.

Mr. Wilson proposed the adoption of the report, including the Treasurer's annual balance sheet.

Mr. Helmore seconded the motion, and in doing so took occasion to ask Mr. Harpley in what way he considered, as stated in his communication to Mr. Hart Dyke, that the exemption of members of the College from liability to serve on juries, would give a death-blow to quackery. He also wished for some explanation of the statement in the report with reference to the increase of the rent of the building in which their meetings were held. Finally, he expressed his opinion that the apprenticeship clause ought now to be put in force.

The President: Of course you are aware there is no such clause.

Mr. Helmore said, in that case he thought it was highly essential that one should be enacted, because he knew of a gentleman who had recently left school and gone to a veterinary college, and without any practical experience whatever had been able in the course of about twenty months to obtain his diploma, and pass the army examination. He was, no doubt, a clever young man, but such cases were not likely to bring credit to the profession. He would recommend that the affairs of the College should be made as public as possible, in order that the general public might be led to take an interest in them.

Mr. Harpley said the letter which he wrote to Mr. Dykes was in reply to a telegram which he received from that gentleman.

Mr. Helmore: Was it on behalf of the Council, or was it a private letter?

The President: The Council adopted the letter, and it was entered on the minutes.

Mr. Harpley said this was the first time the Government had ever taken official notice of the College beyond granting the charter.

The Secretary, in reply to the question referring to the rent, said the lease would expire at the end of the present year, and the rent would then be raised £40 a year.

Mr. Gowing said the present rental of £60 a year was extremely low, and £100 a year would not be extravagant.

Mr. Hunting, referring to some remarks he had made previously in reference to the action of the Council in the matter of the Juries Bill, said he had done so in ignorance of what had taken place, and was now exceedingly sorry that he had made the observations. There could be no doubt that the President exerted himself far beyond what could have been expected, and probably few men could have carried out the wishes of the members so successfully as Mr. Harpley, in consequence of the position he held, had done. He considered that the Council had taken a great step in advance in publishing the number of attendances of the different members of the Council during the year; and he hoped that in future they would have more working members on the Council.

Mr. Helmore asked what the Council were doing with regard to the renewal of the lease.

The President said the matter was in the hands of the House Committee, the sum of their instructions being that they should try to make an arrangement to get the house by the year; if they could not do that, they were to try to get it for three years, and if that also failed, to get it for a lease for seven years, with power to sublet. At present, however, nothing had been done.

Mr. J. T. Moore complained that the examinations held in Scotland were not conducted with that independent sort of spirit which ought to characterise them; and was proceeding to illustrate his remarks, when—

The President said the subject could not be dealt with at that meeting, as there was no allusion to it in the report. If Mr. Moore would report to the Council on any defects which he observed in the system of examination the complaint would would receive their attention.

Mr. Moore said he should take the earliest opportunity of bringing the matter before the notice of the Council.

The resolution was then put and agreed to.

Mr. Partridge and Mr. Hunting were then appointed scrutineers.

The President said the meeting would now be called upon to elect seven members to the Council—six to supply vacancies caused by retirement in rotation and one to occupy the place of Mr. Silvester, deceased. In previous years com-

plaints had been made that the elections were not conducted in an orderly manner; and he, therefore, now asked that those who had any names to propose would hand the names in to him, and when they were all received they could be read out, and the balloting might then proceed in the usual way. The members who retired by rotation were Messrs. Wilkinson, Moon, Coates, Gowing, T. D. Broad, and Cowie.

The following nominations then took place:

Mr. Naylor, by Mr. Coates.
Col. Sir Frederick Fitzwygram, by Professor Williams.
Mr. Talbot, by Mr. Stanley.
Mr. William Hunting, by Mr. Burrell.
Mr. William Field, junr., by Mr. Mayer.
Mr. Coates, by Mr. Naylor.
Mr. Wilkinson, by Mr. Fleming.
Mr. Moon, by Mr. Dray.
Professor M'Call, by Mr. Morgan.
Mr. Cowie, by Mr. John Moore.
Professor Fearnley, by Mr. Cartledge.
Mr. S. H Withers, by Mr. Hunt.
Mr. Gowing, sen., by Mr. Fleming.
Mr. Cox, by Mr. Field.

Professor Pritchard asked if Mr. Cox retired from the Council or no.

The President said Mr. Cox did retire. The clause in the charter, by virtue of which he had been appointed, was as follows:—"The Council may, if it shall be deemed advisable, appoint some person to fill a vacancy until the day on which the first annual general meeting after the day on which the vacancy shall occur shall be held."

The result of the ballot was as follows:

Mr. Coates	33
Mr. Gowing	32
Mr. Wilkinson	30
Mr. Cox	30
Mr. Moon	26
Col. Fitzwygram	26
Mr. Field	25
Mr. Hunting	21
Mr. Talbot	19
Mr. Withers	14
Professor M'Call	11
Mr. Naylor	9
Mr. Cowie	7
Mr. Mayer	4
Professor Fearnley	3

The President declared Mr. Coates, Mr. Gowing, Mr. Wilkinson, Mr. Cox, Mr. Moon, Col. Fitzwygram, and Mr. Field, duly elected.

On a ballot being taken, Mr. Moon was chosen to fill the place of the late Mr. Silvester.

The President announced that a special meeting of the Council would take place on June 2nd.

Mr. Harpley proposed a vote of thanks to the President for his conduct in the chair, and for the manner in which he had conducted the proceedings of the Council during the past year.

The motion was seconded by Mr. Greaves, and cordially agreed to.

The proceedings then terminated.

CENTRAL VETERINARY MEDICAL SOCIETY.

At an ordinary General Meeting of the above Society, held Thursday, April 9th, 1874, at 10, Red Lion Square, the President, J. F. Mavor, Esq., in the chair,

The *President* mentioned that, having a pigeon which became cramped, and eventually lost the use of its legs and died, he had examined the body, and found some gritty deposit on the external surface of the pericardium and outer surface of the heart, which the microscope showed to be composed of crystals of urate of soda. He considered that this deposit depended on a type of rheumatism.

The *President* next exhibited a portion of a large calculus, which had been removed by operation from the bladder of a mare. The animal was doing well. The portion exhibited was as large as a fowl's egg, ovoid in shape, and of a brown colour, having many minute crystals on its surface. He had not determined its composition.

The consideration of Mr. Batt's paper on rheumatism was then proceeded with. A long discussion ensued, in the course of which *Mr. Hunting* expressed himself as differing materially from Mr. Batt in his views of the disease. He believed that cold alone could operate as a predisposing cause, and doubted the disease being due to the presence of lactic acid in the blood.

Mr. Gowing, sen., believed rheumatism originated from cold and wet, and related a case in point. He treated the disease antiphlogistically.

Mr. H. Withers observed that the sheaths of tendons were

mostly affected, in which cases he found it useful to blister the legs. His constitutional treatment consisted of mercurial aperients.

Mr. J. E. Jarvis considered slight clothing a preventive. The disease chiefly affected the better-cared-for animals. He had also noticed the liability of the patient to gouty deposits; in his cases he had found turpentine liniments very useful.

Mr. Clark inquired whether Mr. Geo. South or any of the members had used colchicum in this disease.

Mr. South stated that he had used this agent, but had not observed any beneficial effects from its employment.

Mr. Burrell regarded cold as a cause of the disease by its retarding the sebaceous secretion; if due to lactic acid in the blood he thought that the heart would be affected early in the disease, whereas it was seldom implicated. He regarded the malady rather as a nervous one, arising from any cause which was depressing to the vital functions.

Mr. Moore, sen., believed cold alone was the cause in many cases. There was also in some animals an hereditary predisposition to become affected. He had observed this while attending at some breeding studs.

The *President* differed from the essayist. He classed the disease with gout, cataract, calculus, and some skin affections. Indeed, he could scarcely speak of it as a separate affection. He considered that it arose sometimes from deranged function of the liver—that function which converts the glucose into glycogen, which appears to exert its influence in the production of heat. Gout never occurs without an excess of nitrogen in the blood. The local effect of cold deranged the periphery of the nerves, thus lowering the blood's temperature and disturbing the function of the liver.

The *President* having notified the election of Mr. George South, of Bond Street, as a Fellow, a resolution was passed in favour of further discussion of the subject of Mr. Batt's paper at the next meeting.

Present: 15 Fellows and two visitors.

At the subsequent meeting, held Thursday, May 7th, the President occupying the chair, the subject of rheumatism was again considered.

Mr. Batt, in reply, said that the discussion had not altered his opinion as to the causes producing rheumatism. He had had cases amongst cart-horses, but not many, the affection being more amongst the better-bred horses. The difficulty with him lay not in the treatment—which, as a rule, was successful,—but in the length of time the cases occupied his attention. With reference to the existence of lactic acid in the blood, and its preponderance

in the system in this disease, he affirmed that the urine, the breath, and the perspirable fluid were all acid. In reference to gouty deposits and the quickness of their formation, he stated that in *post-mortem* examinations made by Dr. Richardson of cats and dogs which had been experimented upon by injections of lactic acid, and died forty-eight hours afterwards, deposits were found on the heart and the cause of death ascribed to carditis.

A vote of thanks being awarded Mr. Batt for introducing the subject, and replied to by him, the meeting was adjourned.

Present: 9 Fellows. JAMES ROWE, Jun., *Hon. Sec.*

YORKSHIRE VETERINARY MEDICAL SOCIETY.

THE spring meeting of the Society was held at the Queen's Hotel, Leeds, on Thursday, 30th April, the President, Mr. Broughton, in the Chair.

The following members were present, viz., Messrs. Naylor, Greaves, James Freeman, Anderton, Day, Bale, Scriven, Cuthbert, and Ferguson, Hon. Sec.

Apologies for non-attendance were received from Messrs. Dray, Carter, Patterson, Peter Walker, Nicholson, and Joseph and John Freeman.

The minutes of the last meeting were read and confirmed.

Mr. J. E. Scriven, M.R.C.V.S., Aberford, near Leeds, was unanimously elected a member.

The President read a letter which he had received from Professor Tuson, of the London Veterinary College, kindly volunteering to read a paper or deliver a lecture to the members of the Society, at the July meeting. The Professor's kind offer was accepted with thanks.

Mr. F. J. Day read an instructive paper "On the General Anatomy and Diseases of the Eye of the Horse, and other domesticated animals." The principal topics discussed were, first, the treatment of injuries to the cornea, the essayist suggesting that, in severe laceration of that structure, the eyelids might be brought together by sutures, as is sometimes done in the human subject.

Secondly. Cataracts, their different pathology, and whether they can be produced suddenly.

Messrs. Naylor and Ferguson related cases occurring under their own immediate observation, where opacity of the lens had taken place from falls when no external marks of injury were apparent.

Thirdly. The treatment of ophthalmia was next dwelt upon.

Most of the members present detailed their *modus operandi* of combating this formidable disease.

A cordial vote of thanks to the essayist concluded the business of the meeting.

J. H. Ferguson, *Hon. Secretary.*

LIVERPOOL VETERINARY MEDICAL ASSOCIATION.

The thirty-ninth Quarterly Meeting of the Association was held on Friday evening, the 8th May, in the Medical Hall, Hope Street. The following gentlemen were present:—George Morgan, Esq., President;. Messrs. Hayes, Reynolds, Kenny, Harwood, Wren, Sumner, and Proctor (Liverpool), Messrs. Greaves, Faulkner, and W. A. Taylor (Manchester), and Mr. W. A. Cartwright (Whitchurch). After tea the President took the Chair, when Mr. Kenny moved, and Mr. Sumner seconded, that a letter of condolence be sent to the family of the late Mr. Briscoe.

Mr. Kenny read a paper on Intestinal Obstructions in the Horse. The paper was short, but full of practical ideas and suggestions. It gave rise to an animated and highly interesting discussion, in which every one present took part. Mr. Greaves urged the necessity and importance of repeated exploration of the rectum during the treatment of all these cases. He had by such means succeeded in reaching the obstruction, and removed it, and he was of opinion that such cases were more frequent than we were aware of. He also advocated puncturing the abdomen whenever there was much tympany present, as he believed there was not the slightest danger in the operation, and it would afford immediate relief. He thought that the best place for puncturing was a few inches to the right side of the linea alba. Several members concurred, but others thought the right lumbar region best. All agreed that the operation might be performed much more frequently with good effect than it was, and that it was attended with less danger than generally supposed. Mr. Sumner moved the adjournment of the debate until the October meeting. It was suggested that each member should try the operation of puncturing for tympanites, and report the result at the next meeting. After the usual votes of thanks, the meeting terminated.

C. W. Elam, *Hon. Secretary.*

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

DISCUSSION ON THE CATTLE DISEASE.

In calling attention to the spread of the mouth-and-foot disease, the *Hon. W. Egerton, M.P.*, said the withdrawal of the Orders of Council which tended to keep foot-and-mouth disease in check had led to extensive outbreaks. In his opinion these Orders had been of great benefit; and he considered that efforts made to prevent the spread of the disease in the early stages of an outbreak, when the disease appeared to be communicated by contact, were much more efficacious than those resorted to at a later period, when the disease was extensively spread by atmospheric influences.

Lord Chesham quoted his experience in reference to an outbreak amongst his own Shorthorns, and expressed his conviction that the best thing to do is to let the disease take its course.

Mr. Bowen Jones referred to the action of the council, previous to the appointment of the Select Committee of the House of Commons on the Contagious Diseases of Animals, and to the investigation which had been made by the secretary into the trade in animals with special reference to this matter; and he suggested that as a change of Government had taken place, the recommendations of the council should be laid before the Government again.

Mr. Jabez Turner stated that the foot-and-mouth disease was at present very virulent near Peterborough; it had been introduced by cattle which came from Ireland through Bristol. He considered that the ravages of the disease had been very much understated, and that the disease was now much more virulent than it used to be. What he desired was to be prevented from carrying infection to his neighbours, and at the same time that his neighbours should be prevented from bringing infection to him.

Lord Eslington also supported Mr. Egerton. He thought that great weight would be attached by the Government to representatives from the council, and he considered that restrictions should be placed upon the movement of diseased cattle.

Mr. Dent Dent having been a member of the Select Committee already referred to, expressed the opinion which he had formed in attending the meetings of that committee, and had deduced from the evidence brought before it that it was necessary to keep up the machinery of the veterinary department to deal only with cattle plague. He had therefore concluded that with

this exception it was better to do away with veterinary restrictions altogether; to deal with foot-and-mouth disease effectually the regulations would require to be as stringent as those which were in force during the prevalence of cattle plague. With regard to the compulsory order to slaughter in cases of pleuro-pneumonia, Mr. Dent thought that it entailed a great expense on the ratepayers, and did not restrict the progress of the disease.

Mr. Milward was entirely opposed to Mr. Dent in reference to the Order as to compulsory slaughter in pleuro-pneumonia, as under this Order in his county they had restricted the disease to a radius of five or six miles, whereas otherwise he was convinced that it would have spread over the whole county.

Col. Kingscote C.B., M.P., expressed himself as entirely opposed to Lord Chesham in reference to the foot-and-mouth disease: he thought that a deputation from the council should go to the Lord President of the Council with as little delay as possible.

Mr. Matthew White Ridley, M.P., supported Mr. Dent in reference to the opinion arrived at by the Select Committee to which reference had been made, and of which he also had been a member. It had been proved that foot-and-mouth disease was highly contagious, and therefore required such stringent regulations for its control as would not be tolerated by the farmer. He quoted the stoppage of importation from Ireland, and the prohibition of fairs and markets, as examples of the restrictions that would be necessary. Therefore he did not consider it desirable for the council to make any representations to the Government.

Mr. T. C. Booth differed entirely from Mr. Dent and Mr. Ridley, and quoted the experience of the Australian authorities iu preventing the spread of foot-and-mouth disease brought into those colonies by stock imported from England.

Mr. W. Wells hoped that if the council made a representation to the Government, they would draw attention to the state of the law relating to pleuro-pneumonia as well as to foot-and-mouth disease.

After some further observations by Mr. R. Leeds, Mr. G. Turner, Mr. Brandreth Gibbs, and other members of the council, the *Hon. W. Egerton, M.P.*, stated that he still thought it desirable to draw the attention of the Government to the necessity of preventing the circulation of diseased animals, of reporting infected farms, and of giving power of entry into infected farms; and he further considered that the report of the Select Committee which had been referred to did not represent the opinion of agriculturists. He therefore moved—"That a deputation be appointed to wait upon the Lord President of the Privy Council and call his atten-

tion to the recent outbreak of foot-and-mouth disease, and to the withdrawal of the Orders of Council which previously related to this disease."

This resolution was carried by fifteen to eleven.

A deputation was named accordingly, including the President, Lord Eslington, Hon. W. Egerton, M.P., Col. Kingscote, M.P., Mr. J. Turner, Mr. T. C. Booth, Mr. B. Jones, and Mr. Rawlence.

Veterinary Jurisprudence.

SHIPPING SHEEP TO AUSTRALIA.

DEATHS FROM ALLEGED NEGLECT DURING THE VOYAGE.

OLD COURT-HOUSE, MELBOURNE.—FRIDAY, *March* 13*th*, 1874.

(Before his Honour Mr. Justice FELLOWS and a Special Jury of Twelve.)

ROW *v.* DAVES.

THIS was an action by Mr. Fred. Row, fellmonger, against Mr. Edward Daves, captain of the ship "Lincolnshire," to recover £995, the value of some sheep placed on board the vessel, to be carried from London to Melbourne, but which either died or were allowed to very much deteriorate in value during the voyage.

Mr. Ireland, Q.C., Mr. Higinbotham, and Mr. Williams for the plaintiff.

Mr. Billing and Mr. Purves for the defendant.

The sheep, 22 in number, were shipped on board the "Lincolnshire" in November, 1872, to the order of Croaker, Scott and Co. The bill of lading was assigned to Mr. F. Row. It contained a clause that the sheep were to be placed on deck at shipper's risk, the ship not to be accountable for mortality or jettison. There was also the usual clause against losses by perils of the sea, &c. The plaintiff's agent in London, in negotiating for the freight, proposed to the agent of the ship that the freight should be six guineas per head on all delivered on board in London; the ship's agent objected to this, and the freight arranged for was £8 8s. per head on all delivered alive in Melbourne.

The ship made a passage of some 78 days from Plymouth. Three of the sheep died on the voyage, and a fourth just about the time of the arrival in Hobson's Bay, The others were landed in such a bad condition that six of them died in quarantine.

The law requires all sheep arriving from abroad to be dipped before being landed, and to be afterwards placed in quarantine for some time. These sheep were dipped, not as for scab, but as a disinfectant. According to the case for the plaintiff, the sheep

died from neglect on the part of the ship's officers. The sheep were longwoolled, of the Lincoln breed, and had been shorn in June 1872. They were not reshorn before they were placed on board; the plaintiff's witnesses said it was not usual to do so.

Witnesses for the defendant said that it was usual to shear the wool to the length of about 3 in., whereas these sheep had 7 in. or 8 in. length of wool.

Plaintiff alleged that the pens in which the sheep were placed were unfitted for them. The pens were 3 ft. 1 in. in height, 2 ft. 6 in. in width, and 9 ft. in length, and in these four sheep were placed, the amount of room being considered altogether insufficient. The pens were also so constructed that there was not enough ventilation.

Defendant's witnesses asserted that the space allowed was quite sufficient, and that the ventilation was ample.

The next ground of neglect was that improper food was supplied, namely, compressed hay and some patent food. The food principally supplied was the hay. Some of the passengers said that it looked very stale and did not smell well, and a veterinary surgeon who examined the sheep in Melbourne said that the hay was worse than the patent food. Another veterinary surgeon said that the patent stuff was the worse of the two.

On the other hand, it was alleged by the defendant that when plaintiff's agent was contracting for the freight he expressed a wish that the fodder should be supplied by a person named Bartholomew, and this was acceded to, the ship's agents obtaining the fodder from Bartholomew, and to all appearance it was quite suitable.

Plaintiff's agent said that he made no stipulation of that kind.

The next ground of neglect was in not keeping the pens clean. According to some of the passengers the pens were hardly ever cleaned, and they were allowed to remain in a most disgraceful condition, the stench was abominable, and a great deal of the refuse stuff used to ooze out on to the deck; one of the witnesses said he fell down twice, owing to the slippery state of the deck from this cause. When the "Lincolnshire" arrived here she was boarded by Mr. Graham Mitchell, and a Government inspector of stock, and they found the floors of the pens covered with manure.

Several witnesses for the defence, including some passengers, and the ship's butcher, stated that the pens used to be cleaned out daily, and to receive a thorough scraping twice a week. The captain and the doctor used to visit that part of the ship very frequently, and they observed the place to be clean.

The *Plaintiff* attributed the deaths to disease of the liver brought on by the foul condition in which the sheep were allowed to remain, and also to the bad food.

The *Defendant* attributed the deaths principally to fever brought on by the sheep not having been shorn before coming into the warmer latitudes. The animals cost from £6 to £8 per head in England, and they could be sold in Melbourne—rams, £78 per

head; ewes, £45. The percentage of deaths on board a ship was said to be from 5 to 15 per cent.

His Honour, in summing up, asked the jury to answer the following questions: 1. What was the cause of death, viz., was it disease of the lungs, or of the liver, or both?

2. Would the diseased state of the lungs, or the diseased state of the liver and other organs alone, have caused death?

3. Was the disease of the lungs caused by the length of the fleece?

4. Was it caused by want of cleanliness?

5. Was it caused by the size of the pens?

6. Was the diseased state of the liver caused by bad food?

7. Was the diseased state of the lungs caused by bad food?

8. Did Bartholomew supply the hay and fodder by request of the shippers?

The jury retired at 5 o'clock, and after deliberating three hours announced that three fourths of them had agreed to a verdict for the plaintiff, damages £500. They answered the questions as follows:—

1. We find that the sheep found dead at Sandridge port, and that the sheep which died subsequently in quarantine, died from disease of the liver and the lungs.

2. Yes.

3. Not sufficient evidence to show.

4. Yes.

5. Not able to say, having no evidence of the size of the sheep.

6. The food for the freight and the store sheep having got mixed up, we have no evidence to answer this question.

7. Same answer as to query 6.

8. Yes.

All the questions, except the fourth, were answered unanimously; the fourth by three-fourths majority, and the damages were adopted by the same majority.

His Honour said the defendants could have leave to move to reduce the damages to a nominal sum, owing to the answers to the second and eighth questions.—*Melbourne Argus.*

NEW MEMBER OF THE PROFESSION.

At the meeting of the Court of Examiners of the Royal College of Veterinary Surgeons held in Edinburgh on April 16th, the following name was omitted from among those who passed their examination and received the diploma of the College:

New Veterinary College.

Mr. James Henry Turner Kenyon . . . Manchester.

ROYAL COLLEGE OF VETERINARY SURGEONS. COLLEGE FUND.

The following additional Subscribers to the Fund for Building or purchasing suitable premises as offices of the College completes the List to May, 1874 :—

	£	s.	d.
Bland, Wm. Colley, Esq., Newbury . .	5	0	0
Gould, Geo. Jas., Esq., Southampton . .	2	2	0
King, John T., Esq., Bournemouth . .	1	1	0

ROYAL VETERINARY COLLEGE.—BOTANICAL EXCURSIONS.

The botanical class of the Royal Veterinary College commenced their usual series of summer excursions on Saturday, May 9th. They met on the summit of Hampstead Heath at 3 o'clock, whence they proceeded across the meadows to Hendon, where they arrived at 6 o'clock. During the walk a large number of common wild plants were gathered, and it was observed that several flowers which had bloomed during the early part of April, whilst the weather was warm, were now shrivelled and discoloured in consequence of the cold. Some species, *Ranunculus auricomus*, for example, had also flowered and gone off, leaving the fruit in an unusually advanced state of development for the time of year. Amongst the species gathered in blossom we may particularise the following:—*Ranunculus bulbosus*, *R. repens*, *R. acris*, *R. aquatilis*, *R. hederacens*, *R. auricomus*, *R. flammula*, *Alliaria officinalis*, *Barbarea vulgaris*, *Cardamine pratensis*, *C. amara*, *Viola canina*, *Polygala vulgaris*, *Cerastium vulgatum*, *Lychnis diurna*, *Stellaria holostea*, *S. graminea*, *Geranium robertianum*, *Genista anglica*, *Cytisus scoparius*, *Cratægus oxyacantha*, *Potentilla verna*, *Pyrus malus*, *Chærophyllum sylvestris*, *Pedicularis palustris*, *Veronica chamædrys*, *Ajuga reptans*, *Lamium album*, *Glechoma hederacea*, *Allium ursinum*, *Endymion nutans*, *Eriophorum polystachum*, *Luzula campestris*, *Arum maculatum*. Several of the still more common species were also noticed and referred to their proper natural orders, besides some others which were not in a sufficiently advanced state of growth (*Teucrium*, *Alchemilla*, *Menyanthes*, *Calluna*, *&c.*,) to show their flowers. The class, which was conducted by the College lecturer on Botany, had the advantage of being joined by Mr. Harland Coultas, a botanist who is well acquainted with the phanerogamous plants of the United States. Thus the interesting facts connected with the geographical distribu-

tion of some of our commonest weeds formed one of the subjects of conversation during the field demonstrations. In this way, for example, amongst other things, the old and new world representation of the genus Viola—the free naturalisation of the Shepherd's Purse in the States—and the refusal of the common Daisy to grow wild in America, were commented on. One member of the class succeeded in gathering a specimen of Monkshood (*Aconitum napellus*), but not in the flowering condition. Several old pupils and friends took part in the excursion, amongst whom were Colonel Gibb and Captain Garnett. The total number of gentlemen present amounted to fifty, a fair muster considering the cold and threatening character of the weather.

On Saturday, the 16th, the class had an excellent opportunity of inspecting the botanical treasures of Kew Gardens, between sixty and seventy pupils being present. They met at the Economic Museum at 3 o'clock, and after a general survey of the contents of the Galleries proceeded to the Palm House and thence to the Ornamental Pleasure Grounds. In these grounds, comprising upwards of 250 acres, arboriculture has attained a surprising perfection; the Hornbeams, with acclimatised Horsechestnuts, and Deodars being especially conspicuous. The botanical class, however, was chiefly occupied with noticing the variety of uncultivated wild plants which were very numerous in the neighbourhood of the great lake. Here, in addition to many of the plants observed on the previous Saturday, the students gathered *Caltha palustris*, *Thlaspi arvense*, *Oxalis acetosella*, *Lotus corniculatus*, *Poterium sanguisorba*, *Potentilla reptans*, *Linaria cymbellaria*, *Saxifraga granulata*, and many other species, including a considerable variety of grasses (belonging to the genera *Anthoxanthum solium*, *Poa*, *Phleum*, *Dactylis*, *&c.*) As lecturing and crowd-collecting are not permitted in the Gardens, the class several times received intimations to that effect. Nevertheless, on explaining the object of our visit there seemed every disposition on the part of the keepers to facilitate our studies. Several water-plants of interest were noticed (*Potomageton*, *Anacharis*, *Zygnema*, *&c.*,) and at the Rockwork it was observed that a few of the Ferns had their so-called reproductive organs (*Sori*) more or less well developed (*Lastræa*, *Aspidium*, *Scolopendrium*). One of the most striking wild plants at Kew is the common wild Hyacinth (*Endymion nutans*), which in certain spots forms as it were sheets of azure blue. After leaving the sylvan retreat of the pleasure grounds, the class visited the Winter House, where many good types of Australian vegetation are to be seen (*Proteaceæ*); and, lastly, a visit was paid to that part of the Gardens in which the plants are arranged according to the natural system. For the purposes of study nothing can exceed the value of this comparatively neglected portion of the Royal Grounds. Here one may see a large variety of British and Foreign Phanerogams growing side by side within their appropriate ordinal limits; and already, notwithstanding the coldness of the spring, Aconites, Hellebores, Columbines, and several other interesting generic types of the *Ranunculaceæ* were observed in bloom.

On Saturday, the 23rd, forty pupils of the class spent a most enjoyable afternoon at the Elstree Reservoir and at Stanmore Heath. The wild plants were mostly in a very backward state, but amongst those picked were the following:—*Solanum dulcamara*, *Schrophularia nodosa*, *Digitalis purpurea* (not in flower), *Chelidonium majus*, *Geum urbanum*, *Lotus major*, *Veronica beccabunga*, *V. serpyllifolia*, *Vicia sepium*, *Cornus sanguinea*, *Pyrus aucuparia*, *Polygonatum multiflorum*, *Pedicularis sylvatica*, and most of the plants found on Hampstead Heath at the first excursion. Besides these, several willows were gathered (*Salix fragilis*, *S. caprea*, and *S. repens*), as well as various trefoils, chickweeds, and grasses. The heaths were not in bloom; whilst the ferns, equisetums, and other cryptogams were mostly still in very backward condition (*Pteris*, *Sphagnum*, *Polytricum*, *Scyphophorus*, *Boletus*, &c.). Some attention was paid to the zoology of the district, several living animals being captured and examined (*Lacerta agilis*, *Nepa cinerea*, &c.), one student finding an almost perfect skin-cast of a snake two feet in length.

We cannot conclude this brief notice without thanking the General Manager of the Midland Railway (Mr. Allport) for the special accommodation obligingly afforded us on this last occasion.—T. S. C.

NEW VETERINARY COLLEGE, EDINBURGH. "FITZWYGRAM PRIZES."

Twenty-four students competed for the above prizes, at the New Veterinary College, Edinburgh.

After an examination, extending over several hours, the examiners, namely, Messrs. Borthwick, Kirkliston; Cunningham, Slateford; Balfour, Kirkcaldy; and Maclean, Glasgow, awarded the prizes as follows:—

1st. A gold medal, value £10, to Mr. Matthews, Alford, Lincolnshire.

2nd. Microscope, value £5, to Mr. Flintoff, Deighton, Yorkshire.

3rd. Certificate of merit to Mr. John Morris, Wick, Caithness.

PARLIAMENTARY INTELLIGENCE.

THE SUPPLY OF HORSES.

House of Commons, *Tuesday, May 12th.*

Mr. Brown notified that when the motion of the hon. member for North Lincolnshire (Mr. Chaplin) respecting the supply of

horses in this country was brought forward, he would propose an amendment that the matter should be left to be regulated according to the ordinary law of supply and demand.

CATTLE DISEASE.

May 21*st*.

Mr. Bentinck, in the absence and on behalf of Sir R. Buxton, asked the Vice-President of the Council whether, as there appeared no prospect of the cattle affected with pleuro-pneumonia in Ireland being slaughtered and compensated for, the Lord President would rescind the Order in Council which enforces such slaughter in Great Britain.

Lord Sandon said the Order in Council was issued in consequence of a recommendation of a Select Committee which sat last year; and the Lord President was of opinion that sufficient time had not yet elapsed to enable him to judge whether or not it ought to be rescinded.

ARMY APPOINTMENTS.

War Office; *May* 22*nd*, 1874.

7th Hussars, Veterinary Surgeon Francis Walker, to be Veterinary Surgeon of the first class.

OBITUARY.

We have to record the following deaths:—

Mr. James Murch, M.R.C.V.S., London. His diploma bears date June 18th, 1840.

Mr. B. Briscoe, M.R.C.V.S., of Liverpool. His diploma bears date January 19th, 1819.

ERRATA.

Gentlemen,—At the last quarterly meeting of the Council of the Royal College of Veterinary Surgeons, held April 8th, an error occurred with regard to the announcement of Mr. Rothwell, who presented a petition from the Edinburgh Veterinary College, being a "*rejected candidate*." I find that such was not the case, and that Mr. Rothwell passed his "*First Examination*" in July last.

I am, &c.,

Wm. Hy. Coates *Secretary*.

To the Editors of the 'Veterinarian.'

In May Number, p. 291, line 28, *for* "zebra race," *read* "zebu race."

THE

VETERINARIAN.

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Communications and Cases.

SCROFULOUS DISEASE IN LAMBS.

By S. Wortley Axe, Assistant-Professor in the Royal Veterinary College.

On the 6th of March last I was requested to visit the farm of a gentleman, near Hertford, for the purpose of investigating the nature and cause of a disease affecting a flock of lambs, and among which serious losses had occurred. The lambs were the produce of one hundred and fifty ewes, and at birth all of them presented a fair average condition. The ewes began to lamb on the 14th of January. About the second week in February the disease appeared, and continued to increase in extent and fatality up to the time of my visit, by which time forty had died and thirty others were found to be in a precarious condition. The age of the animals affected varied from one to twenty-one days, and the duration of the malady ranged between five days and three weeks; the stronger-looking lambs were the first to suffer and succumb. The early indications of the disease were attended with a faulty gait, which gradually developed into acute lameness, with more or less complete inability to stand in many of the lambs. As the disease progresses enlargements of various forms and sizes, which soon assume the character of fluctuating tumours, show themselves on the knees, hocks or stifle joints. These swellings soon break, and pour forth a greater or less amount of thick, yellow, pus-like matter.

Similar enlargements are also frequently observed on the forearm and thigh, and others occur about the belly, flank, axilla and throat. In reference to the last-named part, it may be observed that suffocation is by no means an uncommon result; the tumefied parts are hot, red, and acutely sensitive to the touch, and in a short space of time they become soft and fluctuating.

In some cases these symptoms are variously modified or altogether absent. In instances of the latter kind the constitutional symptoms are most marked and severe, and the duration of the malady is brief. The constitutional disturbance is indicated by dulness and indifference to food, which is soon altogether refused. The animal assumes a recumbent posture, and does not evince any desire to move; the pulse is quick and feeble, the breathing accelerated, and a short sonorous grunt is emitted with each expiration; the visible membranes are of a reddish-yellow hue, the mouth is dry and hot, and the bowels irregular. In some instances a defluction of tears from the eyes and mucous discharge from the nose, and an occasional cough are also observed. With the progress of the disease, suffering is much intensified, and in by far the majority of cases the animal succumbs to extensive morbid changes affecting the internal organs, or to the more protracted influence of hectic fever. The lesions exhibited in the several carcases examined varied as to situation and extent, but they were identical in their nature in every instance. On removing the skin from the body, tumours of various forms and sizes were found in the parts indicated above; those more advanced were filled with a pale yellow pus-like matter, of different degrees of consistence, varying between that of cream and of soft cheese, whilst the more recent ones contained a thin, transparent, more or less turbid fluid, in which floated numerous small white flocculent particles. Each sac was lined by an opaque, soft, friable pseudo-membrane, which was readily detached, and when examined microscopically was found to consist of a number of nucleated cells closely matted together in a lamellated manner, without any intercellular substance. The affected joints were not uniformly enlarged, but presented several nodular fluctuating projections of various sizes, which, on being cut into, were found to exhibit all the pathological characters above described.

These tumours appeared to have had their origin in the cellular tissue, external to the capsular membrane, and in some instances they had free communication with each other, and also with the synovial sac. In instances of the latter kind

various degrees of disorganization of the articular cartilage and ends of the bones were noticed. Similar enlargements, circumscribed by thin fibrous cysts, were also met with between the muscles of the abdomen, beneath the fibrous sheaths of the muscles of the extremities, and about the umbilicus. Most of the lymphatic glands were either enlarged, hæmorrhagic, or reduced to a soft cheese-like mass; the abdominal cavity contained a greater or less amount of turbid serum, mingled with small fragments of friable lymph. The peritoneal covering of the liver was inflamed in parts, and at some points was firmly adherent to the parietal reflection and to the neighbouring viscera. The liver presented various sized patches of yellowish-grey matter of the consistence of new cheese and slightly friable. The extent of peritoneal inflammation and effusion appeared to correspond with the extent of this deposit. In some instances the umbilical vein was soft, and presented one or more abscesses in its course; it was also thick and of a dark red colour. The gall-bladder was full of very thin watery bile of a greenish-yellow hue. The alimentary canal presented no evidence of disease. The contents of the chest were generally free from structural change, the only abnormal feature observed being a pallid condition of the lungs and some small extravasations of blood beneath the serous tunics of the heart; these lesions were more frequently observed in the more acute and rapidly fatal cases.

My observations concerning the last-named lesions are in accordance with those of the shepherd, who had made many *post-mortem* examinations. One exception came under my notice, in which the tricuspid valve presented a mass of cheesy deposit on its auricular and ventricular surfaces. The pulmonary artery exhibited an atheromatous ulcer about the size of a shilling, and its small branches were plugged at numerous points. The lungs were covered with small hæmorrhagic patches, which on section were found to be more or less consolidated, and in some instances surrounded by a small mass of disintegrated tissue, the result of embolism.

From a careful consideration of the history of this malady, together with the symptoms presented during its progress, and the lesions observed after death, it became evident that the cause, of whatever kind it might be, originated within the system of the ewes; attention was therefore directed to their feeding and general management. On inquiry the fact was elicited that for eighteen years at least (how much longer could not then be ascertained) the ewes had descended from generation to generation through

the same family, and that no fresh blood, save on the male side, had been introduced into the flock. The condition of the ewes was by no means good; they presented a lean, dwarfed appearance, but all of them seemed free from acute disease. With regard to their general management, it was ascertained that up to the time of lambing their food consisted of turnips and a small quantity of hay, chaff, and malt dust. It should be observed that the turnips were not only much grown and so reduced in nutritive value, but many were also more or less decayed. The newly grown tops were manifestly preferred by the ewes, and, doubtless, constituted a large proportion of their food; this preference, although natural in itself, was farther induced by the bad condition of the roots. Both previously and also subsequently to lambing every care was observed in affording to the ewes and lambs protection from the vicissitudes of the weather; and neither in the character or management of the land upon which the ewes had pastured was there anything to which the outbreak could be attributed.

From the foregoing facts the following deductions were made:—That the continued use of a particular family of ewes through successive generations had caused serious constitutional weakness, and a tendency to strumous disease in this particular flock. This conclusion is rendered more cogent from the fact that some ewes had recently died which, in the words of the shepherd, were "bad in their lungs." The nature and quality of their food was also such as to render their milk, not only incapable in itself of supporting vigorous life, but provocative of disease in the lambs. That this inference is in the main correct is shown by the result of treatment, which had special reference to better feeding and general management, combined with the use of tonics. Turnips were entirely withheld, the ewes were pastured on grass, in a well-sheltered and dry situation; a liberal supply of corn, cake and bran was allowed them, and every protection from cold and damp was scrupulously enjoined. Sulphate of iron and gentian were given in the food daily, in the evening, and a small quantity of salt in the morning.

On the 18th of March, nine days after my visit, the following letter was received from the steward, under whose charge the flock was placed.

Dear Sir,—I am happy to inform you that there is a decided improvement amongst the lambs, very few fresh cases having occurred. I ordered your tonic to be given to

the ewes for a week, and you will, perhaps, tell me if you think it necessary to continue the medicine longer.

Yours truly.

With this marked result the exciting cause of the disease can hardly be doubted. But for the absolute cessation of the use of the grown and decaying roots, and the substitution of a more generous and nourishing diet, the greater part of the lambs would most likely have succumbed to the disease.

What the precise causes may be which lead to the production of this and other allied diseases of lambs is a question of vast importance, alike to the pathologist and the agriculturalist. And having regard to the extent and fatality of such affections, the question is no less a matter of commercial interest. Careful observation and a full appreciation of the phenomena of the morbid processes are not alone essential to the elucidation of such a question, but every particle of historical detail relating to the affected animals, as well as the effect of treatment upon them, must be well considered. The data upon which we have to rely in this direction are scanty and imperfect, and consist of little more than a mere record of a few isolated outbreaks, about the cause of which a variety of opinion prevails.

In the June number of the *Edinburgh Veterinary Review*, 1862, Professor Gamgee, writing of this disease under the title of "A New Disease in Lambs," says, "It was in the month of April last year that the very *first* notice of the disease was published, and I was fortunate enough to be amongst the very first veterinary surgeons consulted." In the *Veterinarian* of 1852, however, ten years earlier, I find a report on an "Endemic Disease breaking out amongst Lambs." It is signed "V. S.," and from the symptoms and *post-mortem* lesions described by the contributor of the article, there cannot be a doubt as to the identity of the affection with that referred to by Professor Gamgee in 1862 as a "new disease."

The outbreak alluded to by him occurred on the farm of Mr. Thomson, of Moneylaws, near Coldstream, on the border of Northumberland. According to his statement, the first few deaths which occurred were not attended with the usual enlargements about the joints, but with a peculiar swelling below the jaws about the size of an orange, soft and fluctuating on pressure; the swelling, which in the first case was noticed on one of the hind quarters, occasionally was observed to also form about the navel or the throat. The

Professor farther observes, "Another disorder appears to have been developed in conjunction with the above, as a few lambs were seized with stiffness in the joints, or joint-ill." In referring to the symptoms he says, "I can briefly state the appearance of a flock I visited with Mr. Robertson, of Kelso; a large quantity had joint-ill or the cripple, as well as the new disease; some could not stand from the pain in their joints and distortion of their limbs." With a just respect for the opinion of Professor Gamgee, I would suggest that what has been regarded by him as a new disease is a common modification of the "joint-ill," characterised by acuteness, a brief duration, and the absence of any marked joint lesions. This form of the affection I have had an opportunity of observing several instances in an outbreak in Herefordshire.

With reference to the cause, Professor Gamgee says, "For practical purposes it is sufficient for us to know that the disease is connected with the plethoric state. If I may use the expression, the animals are too healthy, thrive too fast, and have a blood far too plastic to flow freely through the body." This deduction appears to me to be altogether inconsistent with the condition of the ewes and the general management to which they were subjected, as shown by the following letter, addressed to Professor Gamgee by Mr. Thomson. The latter gentleman says, "Since consulting you and using your prescription no more have been attacked. There were no more turnips laid down on the pastures, and the ewes that were lying on the turnips were immediately drawn off.

"Last summer the ewes were thin in condition, and, not having any rape, they were all tupped upon turnips; after that they for five or six weeks merely got the shells after the hogs and a few carted to the pasture, and on the commencement of the storm began to get mangold that had been previously hutted in the field. Owing to its having been frosted we could not pit it, so they consumed it on the land, and four weeks before lambing they lay upon swedes. So, in fact, I may say they were on full turnips and mangold from the end of September till you advised their removal." In the facts quoted above I do not recognise anything with which the idea of plethora can be associated.

The ewes, it appears, were low in condition in the summer, and from September to April their food evidently consisted exclusively of roots. A more objectionable and ruinous system of management of breeding ewes cannot, in my mind, be conceived.

That the roots, whatever may have been their condition,

played an active part in causing the disease is manifest from the fact that when they were "stopped entirely," and grass and bran diet substituted, the disease ceased to spread.

With reference to the pathological lesions—those described as abscesses in various parts of the body are not in my experience usually associated with plethora, but are rather to be regarded as results of debility and a strumous cachexia.

How far the continued use of particular families of ewes is conducive to the production of the disease in question is important to determine. That in-and-in breeding, as it is termed, does under certain conditions occasion constitutional defects is beyond a doubt. In the breeding of prize stock, however, this process is continued uninterruptedly for very long periods; but it must be borne in mind that, under such circumstances, all the conditions relating to health and vigour are jealously watched and scrupulously enforced. Every regard is paid, not only to the quantity and quality of the food of the animals, but likewise, and in an equal degree, to its uniform administration. Such conditions are opposed to the manifestation of hereditary weakness, and also serve to keep in check any predisposition to disease that may exist.

Nothing, perhaps, tends so much to the embarrassment of the constitution and to the production of disease as the injudicious changes and neglect which are usually permitted in the feeding of sheep, and more especially does this remark apply to breeding ewes, which of all others demand the most careful attention. By far the greater number of fatal diseases to which ewes and lambs are liable are of a preventible nature, and their origin is due, in the majority of cases, to the quantity or quality of food, or to a bad system of management.

It too frequently happens that stock ewes are made the scavengers of the farm, and but little regard is paid to their condition. Turnips which have been "eaten off" by other sheep are, without any additional or more substantial fare, not unfrequently considered by some persons quite sufficient to sustain the system through the trying period of pregnancy; and this altogether regardless of the fact that the maturing of the fœtus is being consummated during the coldest and most trying seasons of the year. Such a system of management alone is sufficient to undermine the constitution of the most hardy; but if there be added to this the continued use of a particular family of ewes through successive generations we can readily understand how a constitutional weak-

ness may be established, which, under certain conditions, will culminate in hereditary disease. Practical experience and the laws of health seem, at least, to favour the idea of superior feeding within certain limits during pregnancy, and this is clearly enunciated in many practical essays on the breeding, feeding, and general management of sheep. For example, in the *Agricultural Journal* of 1858 Mr. Pawlett thus speaks to this point; he says—

"It is highly necessary to keep the ewes well, and they should have some dry food—either corn, hay, or clover chaff—at least three weeks or a month before lambing, or there will in many cases be much loss with the young lambs. Experience certainly leads me to this conclusion. Before I kept my ewes well I lost many lambs when young, it being my usual custom to keep them on swede turnips."

Too much importance cannot be attached to the condition of turnips as food for breeding ewes; in an open spring they are usually much grown, and in this state I know of nothing so conducive to disease.

REVISED LIST OF ENTOZOA, WITH NOTES AND REFERENCES.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

(*Continued from* p. 300.)

6. The Serrated Tapeworm (*Tænia serrata*).—Though similarly named, this worm is very distinct from the toothed species. It ordinarily attains a length of from two to three feet. The head is armed, and readily distinguished from that of other allied species by the prominence of the proboscis on which the large hooks are situated.

Infests the small intestine of the dog; and in the larval condition (*Cysticercus pisiformis*) it takes up its abode in the abdomen of hares and rabbits. It has frequently been reared artificially, both at home and abroad, by Von Siebold, Küchenmeister, Leuckart, myself, and others.

Note.—The free joints of this and the succeeding species are frequently mistaken for independent parasites, and they have been erroneously described as mawworms of the dog.

Specimens.—In the Royal Veterinary College and Hunterian Collections, also in the Museum attached to the Middlesex Hospital, and in the British Museum.

Figured by the author ('Linn. Trans.,' vol. xxii, pl. 33, figs. 73-4), and by many other observers (Goeze, Gurlt, Leuckart, Krabbe, &c.).

7. The Margined Tapeworm (*Tænia marginata*).—This is a larger species than the above, and readily distinguished by its broader neck and truncated head, which is also armed with hooks. It attains a length of from five to eight feet.

This worm infests the dog. It is more common than the preceding, with which, however, it is not unfrequently associated and sometimes confounded.

In the larval state (*Cysticercus tenuicollis*) it resides in the abdominal cavity of the sheep, as proved by numerous feeding experiments conducted in this country and abroad (Leuckart, Von Siebold, Küchenmeister, Simonds, myself, and others).

Specimens.—Several of the adult worms in the author's collection, and one from a wolf, in the Hunterian Museum. Examples of the larvæ in the Royal Veterinary College Museum, and also at the Royal College of Surgeons, Lincoln's Inn; in the Edinburgh University Anatomical Museum (mounted by the author), and in the British Museum.

Figured by Leuckart, Krabbe, and others. The larvæ also represented in the author's manual (p. 101) from Goeze, who gives numerous illustrations.

8. The Gid-hydatid Tapeworm (*Tænia cœnurus*).—This species varies from eighteen inches to two feet in length. It is a more delicate form than either of the preceding, and comparatively rare in this country. The head is pointed in front and narrowed below into a fine neck. The reproductive organs occur singly on each joint.

Infests the small intestine of the dog, its larvæ forming the well-known hydatids (*Cœnurus cerebralis*) so productive of gid in the sheep.

Experiments.—This parasite has been repeatedly reared in this country (Simonds and Cobbold) and abroad (Küchenmeister, Leuckart, Röll, Haubner, Gurlt, Eschricht, Van Beneden, Möller, &c.).

Published Cases.—The English literature of "gid" is extensive, and will be referred to subsequently. The adult worm has not been specially described as giving rise to symptoms, although it is probably as injurious as some other cestode species.

Specimens, in different stages of growth, are preserved in the Museum of the Royal Veterinary College.

Figured by Krabbe (hooks and proglottid).

9. The Cucumerine Tapeworm (*Tænia cucumerina*).—From associated forms of tapeworm this species is readily recognised by its very delicate body and thread-like neck, and also by the circumstance that its somewhat cucumber-shaped adult joints display reproductive papillæ on either side. The entire body varies in length from one foot to twenty inches. It is exceedingly common. Infests the small intestine of the dog, being also occasionally found in man.

Experiments.—For the interesting and remarkable discovery of the origin of this tapeworm we are indebted to the researches of N. Melnikow. Its larvæ reside in the common louse of the dog (*Trichodectes latus*). The experimenter succeeded in "measling" lice by supplying them with the sexually mature segments of the cucumerine tapeworm as food (*Arch. für Naturg.*, 1869).

Cases.—In a paper originally communicated to the Linnean Society I have incidentally noticed the presence of these tapeworms as a cause of death. In the dog in question I found about 500 of these tapeworms associated with other species, both cestodes and nematodes.

Specimens.—In the Royal Veterinary College and Middlesex Hospital Museums, and in the National Collection.

Figures of the adult worm are given by Goeze, Bloch, Werner, Creplin, Gurlt, Von Siebold, Dujardin, myself, and others. The measle is illustrated by Melnikow.

10. The Lettered Tapeworm (*Tænia litterata*).—This entozoon varies from one to four feet in length, and bears a general resemblance to the above. It is readily distinguished by the unarmed head and by the central position of the reproductive outlets on the ventral aspect of the joints.

It infests the small intestine of the dog and cat.

Note.—The lettered tapeworm is abundant in Iceland, and occurs, according to Krabbe, in 21 per cent. of the dogs and in 35 per cent. of the cats.

It also infests other carnivorous animals, and, as stated in the 'Manual' (p. 126), I have obtained it from a cheetah (*Canis jubatus*) which died at the Zoological Gardens, Regent's Park. So far as I am aware, it has not yet been observed in any English dog or cat.

Specimens.—Several in my private collection (contributed by Professor Krabbe), besides others from the cheetah above alluded to. In the British Museum there is a specimen

alleged to have been obtained from the fox. Like most of the helminths preserved in the National Collection, it is one of a large series purchased from the private collection of Dr. Von Siebold.

Figured very completely by Krabbe.

PELVIC HÆMATOCELE.

By John Gerrard, M.R.C.V.S., Market Deeping, Lincolnshire.

I am induced to send you a few notes on a case of this nature; also a few remarks on the disease generally, believing it to be of rare occurrence, or, at least, rarely recognised in our patients; indeed, it has only lately been recognised by the medical faculty. No cases, so far as I have been able to ascertain, are on record; our text-books do not contain any allusion to the affection, nor have I heard it treated of by any teacher I have ever listened to, either as a *post-partum* incident or otherwise. I have no doubt, however, but that it must have been met with in practice, although it may not have been recognised, or not considered of sufficient interest to warrant its being recorded.

In our patients it may occur after parturition, as in the case I take the liberty of recording; and also after the period of æstrum in cows, but more especially in heifers of about eighteen months of age, after being first put to the male, in which case it is often a source of great loss and annoyance. I have, within the last two years, seen three cases of this kind, and what seems a very strange feature of the disorder is that all the animals had light-coloured hair. This peculiarity was brought to my notice last year by an old fellow-student, Mr. A. Simpson, of Kendal, Westmoreland, who had seen several cases, all in light-coloured animals. If this peculiarity should be found to constitute an essential condition of the disease it would point to something of a constitutional nature, but I am inclined to regard it as a mere coincidence, which may be accounted for on the supposition of a large proportion of the heifers in a district being of a light colour. Moreover, I have seen two cases in old cows, both dark-coloured ones.

The symptoms are by no means uniform, consequently no diagnostic one can be adduced. In one of the cows above named severe straining was most prominent, while it was

altogether absent in the other, and as they were both killed —the owners not caring to submit them to operation—I had an opportunity of examining the tumours and confirming my diagnosis. The one in which no straining was present presented all the symptoms of indigestion for five days, would eat very little, passed fæces in small dry pieces with difficulty, till at last no passage could by any means be effected. On endeavouring to introduce my hand to take away the hardened fæces I could feel a large swelling, about five inches from the anus, almost filling the pelvic cavity and rendering an exploration almost impossible.

The tumour measured 13 inches in its longest diameter and $7\frac{1}{2}$ in the other. It was firmly attached to the right side of the pelvis, about the middle of its longest diameter —in fact, it was situated between the folds of the broad ligament of the uterus, whose place it had almost usurped. The tumour contained a quart of bloody serum, in which were a number of fibrinous masses and shreds of lymph. The walls were thickened by inflammatory effusion and the adhesion of the surrounding cellular tissue.

In the other case, that in which the severe straining was present, the symptoms were more urgent and decided, but the *post-mortem* appearances not so well marked. The inflammation was more diffuse, the tumour not so large, and was situated between the uterus and rectum, the tissues about the latter being much infiltrated. The tumour contained about half a pint of bloody fluid and a number of small blood-clots, which were also to be seen between the folds of peritoneum surrounding the uterus, as if a rupture of some small blood-vessel had occurred, which, however, I could not detect. In one of the heifers previously mentioned I opened the tumour through the vagina, when the same kind of fluid and clots came away, but the straining induced was so violent, and the parts became so tumefied, the weather being also very warm, that the owner would not risk the chance of recovery.

A case occurred a few weeks ago in another of our patients whose flesh we are not yet reconciled to consume with as great a gusto as our Continental friends, on which I performed the operation successfully. As it is not of frequent occurrence, I thought it might interest some of your readers; besides, I think it a debt due to those professional brethren (alas! too few) who occasionally record cases or otherwise contribute their quota of information for the general good.

History.—On the 30th of April last a five-year old *grey* cart mare, of great substance and high condition, foaled

with some difficulty her first foal. The foal was very large, but in the right position. She had been assisted by the owner and some of his men, who had been in no hurry to interfere, thinking it all would come right with a little time. The throes being violent, and the fœtus large, about nine inches of the rectum were forced through the anus; the intestine, however, returned to its place again when the fœtus was got away. Everything went on favorably for about twelve hours, when the mare began to evince symptoms of colic, frequently lying down and getting up again. Little notice was taken of her condition for some hours, till, in fact, the symptoms became more urgent, when I was called to her—twenty-four hours after she had foaled.

I found the pulse 65 and full, temperature 103°, breathing slightly increased, anxious countenance, lying down frequently and getting up again. Slight propulsive pains showed themselves while the mare stood up; the animal also had a peculiar way of walking backwards, and even pushing herself against the wall or into a corner of the building.

Exploration *per vaginam* showed the parts to be healthy and the os uteri contracted; a copious discharge of coffee-coloured fluid came away on my hand being withdrawn. The parts were very warm to the feel and tender to the touch, giving evidence of slight congestion. I washed the vagina out with tepid water and soap, and injected a weak solution of carbolic acid and glycerine in water, applied a mustard-poultice to the loins and belly, gave an opiate draught, and drew off the urine.

On my second visit, six hours after, no alteration was apparent, the walking backward was more observable, the fæces came away in small masses at a time, always after she had been against the wall; these expulsions were accompanied by a groan and a good deal of pain. I was now informed of the inversion of the rectum, and on introducing my hand found a rough, thickened portion, about nine inches from the anus, through which my hand could only pass with difficulty. It seemed as if, at the point where the inversion had commenced, there was thickening of the gut from submucous effusion. The normal velvety feel had changed into a dry, roughened condition, beyond which all was healthy. I anticipated a fatal stricture. However, I washed out the gut with soap-and-water clysters, introduced a sufficiently large lint bougie saturated with Tinct. Opii and smeared over with Ext. Belladonnæ.

It was impossible to retain the suppository in position for any length of time, so I had to have recourse to oleaginous

injections with an occasional one of a watery solution of Ext. Belladonnæ, and kept the fæces fluid by saline cathartics. The mare continued much in the same state for four days, eating moderately; the fever, however, subsided, and there was every prospect of a safe and speedy cure. On the evening of the sixth day after delivery I was called again to see the animal, and found her in great pain from having partaken too freely of grass, with which she had been supplied for the first time; she recovered in a few hours. Next evening I was again summoned to see her, as nothing would pass through her. I found the stricture very much increased, particularly on the lower side of the gut, and could scarcely pass my hand at all, but having done so with difficulty the stricture relaxed somewhat and I got away some fæces. Introducing my hand into the vagina I found that a tumour had formed immediately below the stricture of the gut, extending nearly to the os uteri. From its fluctuating feel I thought it contained pus, but the absence of all constitutional irritation, the short time in which it must have formed, together with the absence of pain on pressure, negatived this supposition. Besides, the tenderness and relaxed condition of the parts from the inversion of the gut rendered it highly probable that some of the uterine or ovarian vessels had given way, and as a result that a blood tumour had been formed.

An inflammatory tumour is generally painful to the touch, and in its early stages is very hard and unyielding, and in its later stages, after suppuration has taken place, fluctuation is felt. A blood-tumour is comparatively soft and elastic, but the feeling of fluctuation is never so distinct as in the inflammatory tumour, nor are there any constitutional symptoms associated with the blood-tumour until by its enlargement it interferes with some of the excretory processes. As this one answered all these conditions, I informed the owner that nothing could save the mare but opening the tumour. To this course he rather demurred. I consulted a medical gentleman, who kindly saw the animal and examined the tumour, and was of the same opinion as to its nature, but thought it better not to operate, as tumours of this kind often subside without any surgical interference. He advised me to lock up the bowels by large doses of opium and introduce graduated bougies to reduce the stricture of the gut. Such a course may be practicable and proper in the human subject, in whom defecation may take place only once in two or three days and even at much longer intervals in some cases; but in a quadruped, living on coarse, bulky food, and performing the act at least every four hours in a normal condition, I

did not think it would be proper or practicable, more especially as the mare was under the action of cathartics, and the fæces were accumulating behind the stricture. As I was the responsible agent in the case, I kept my own counsel and did not lock up the bowels, discontinued the cathartics, and supplied her with gruel and milk, as she would eat nothing but grass. I introduced bougies, but had great difficulty in keeping them in.

On the evening of the ninth day, or the one after the visit of my medical friend, I found the animal much worse; she had eaten nothing all day, the breathing was very short and quick, pulse 85 and wiry, the pain continuous, and the straining severe. The tumour was increasing, and the fæces could only be got away with difficulty. I told the owner that her death was only a matter of a few hours; and that the only chance—and that a doubtful one—lay in opening the tumour. To this he consented. By this time it had increased considerably, and extended from the os uteri to within five inches of the external orifice. No distinct pointing could be felt or much fluctuation, but it was evident the increase was owing to secondary inflammation.

Throwing up some warm water to moisten and relax the parts, I introduced an ordinary pocket operating knife, with which I made a free incision into the most dependent part of the tumour, about nine inches from the external orifice, sufficiently large to admit the fore-finger and thumb, for breaking down the septa and blood-clots and fibrinous masses. These came away in great numbers. The fluid portion was less than I anticipated, but my statement of quantity would only be approximative.

The immediate effect of the operation on the stricture was *nil*, but the exhaustion of the system was so great that I gave a pint of port wine in some gruel, and about an hour afterwards Æther. Sulphurici, Æther. Nitros., aa ℥j; et Aq. Menthæ Pip. Oj.

Three hours after, the mare seemed much easier than she had been for the previous twenty-four hours; she had lain for two hours, after which she got up and began to eat. Gave some more wine and gruel. In the morning, or about twelve hours after the operation, the stricture had somewhat relaxed; I could introduce my hand with more freedom and bring away fæces, but found that a large dilatation of the gut had taken place beyond the stricture. This complication threatened to be the most formidable of any that had occurred; for in two days after the operation the mucous membrane of the gut sloughed and came away in patches, leaving a raw bleed-

ing surface of submucous tissue. I was scarcely prepared for this complication, and began to reflect on the advice of my medical friend; however, it was now too late to retrieve my error, if any had been committed.

The bleeding was profuse; it had now continued some time, and was evidently affecting the system, nor were the means of arresting it very patent to me at that time. The only hæmostatic I had with me that could be of any service was that indispensable drug, opium. The influence of opium in arresting hæmorrhage and in sustaining life, when death seems imminent from loss of blood, is admirably described in an essay by Dr. W. Griffin ('Medical and Physiological Problems,' &c., p. 201; London, 1845):—"The writer shows that after severe uterine hæmorrhage, when the countenance is sunk, the mucous membrane blanched, and the heart-beat scarcely perceptible, when spirits seem of no avail, this one remedy is capable of restoring life. Death from hæmorrhage is not so much owing to mere debility of the heart's action as to loss of nervous power in the brain consequent on it. The opium stimulates the heart, while it restores a sufficient degree of tension in the vessels of the brain to prevent syncope. It must be given in large doses in conjunction with wine or brandy. It is a singular fact that in similar states of debility, induced by acute or chronic disease, or by other causes than hæmorrhage, opium is useless."

I accordingly administered ℥ijss Tinct. Opii in about half a pint of wine, and applied pledgets of tow saturated with it to the bleeding surface, as well as I possibly could. The effects were not very favorable on the system, for the bleeding continued more or less for three hours. She was supported with gruel and milk, which she drank readily.

I then applied the late Sir James Y. Simpson's favourite styptic—the perchloride of iron dissolved in glycerine.

A saturated solution of this agent in glycerine is more adhesive to the surfaces with which it is placed in contact than the solution of it in water. This on a piece of tow applied to the bleeding surface had the desired effect at the time; but as the fæces had all to be taken away by the hand for ten days nearly, slight bleedings took place occasionally, which were stopped by its application.

I am afraid this communication is already too long to admit of more detail, although many minor particulars are omitted that might have been interesting to your readers. Suffice it to say that, by daily washing out the wound and keeping it open, it healed up kindly; no trace of the tumour

ultimately remaining. The stricture gradually relaxed, the mucous membrane was reproduced, and the mare now voids her fæces as formerly. In short, she made a good recovery, and yesterday, when I examined her, was in a condition as if nothing had happened. She is in possession of her owner, Mr. Kenelm Neal, farmer, Boston Fen.

CONGENITAL HYDROCEPHALUS IN A FŒTAL FOAL.

By Harry Olver, M.R.C.V.S., Tamworth.

The report of a case of "Congenital Hydrocephalus in a Fœtal Ass," by Assistant-Professor Axe, in last month's *Veterinarian*, induces me to send you a few particulars of a similar case in a fœtal foal which came under my notice a short time since.

On the 17th April, 1874, Mr. George Cox, of Middleton, sent, requesting my immediate attention to a case of difficult parturition in a mare. On my arrival I found a light-legged cart mare in great pain, and on examination *per vaginam* I found the two fore legs of the fœtus in the passage, with the head turned back, so that I could not reach it; I therefore determined to skin and take away the fore legs. This I succeeded in doing, and then found an enormously enlarged head, which I at once surmised was due to hydrocephalus. Accordingly I endeavoured to pierce the cranium and let the fluid contents out, but in this I was unsuccessful, and as I found it impossible for the head to be born, I advised that the mare be put out of her misery. This suggestion was at once carried into effect. After death I cut through the flank into the uterus, and brought to light the fœtus, which was perfectly developed, every organ was normal with the exception of the brain, and Mr. Cox says that he thinks the foal was alive when the mare first showed signs of parturition. The cranium measured thirty-six inches in circumference, ten inches from orbit to orbit, and twenty-seven inches from the occipital crest to the nasal bones. At least six quarts of fluid were contained in the cavity, and the little cerebral substance that remained was quite disorganized and the dura mater much thickened. The cranial cavity, to my surprise, was almost wholly surrounded by bone; the only portion which was protected by skin without the inner lining of bone was a circumference of about four inches at the top.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.L.S., &c. &c.

(*Continued from p.* 422.)

We must not dismiss the Linaceæ without mentioning the *Linum catharticum—Purging flax*—a small wild species very common to cold, sterile lands in upland districts. It has the reputation of possessing strong cathartic powers. Dr. Syme says of it that "the whole of this herb is cathartic, and was formerly extensively employed in medicine, but is now little used. It has an intensely bitter taste, and is without odour. Its action is very uncertain, and it is not therefore often given by the regular practitioners of medicine." The fact is we never knew it employed in medical practice, but as we know that it prevails to a large extent in all meadows that have reputed scouring properties in the cases of cattle that feed upon them, it is just possible that these may be due, at least in part, to the presence of the purging flax, though we must at the same time admit that the general badness and poverty of the herbage in the natural habitats of the purging flax is in itself a good reason for that general upsetting of the digestive organs which follows from bad pasturage. The constant companions of the purging flax will be sedges, rushes, ox-eye daisy, common daisy, and other perfectly useless feeding plants, which not only indicate that good grasses are absent, as these occupy their places, but that the land is ill-drained and poor in every sense of the word. It would be well, then, that those who have to deal with cattle should be aware of these facts, as it often happens that a change to another and better cultivated meadow relieves many obscure disorders like a charm.

The *Oxalidaceæ*, which come next in order, are remarkable for their acid properties, which are due to oxalic acid; hence our native species, *Oxalis acetosella*, has been used in fevers, and its leaves chopped fine form a very agreeable sauce. This plant has by some been supposed to be the true shamrock, though usually St. Patrick's Day is kept with a sprig of trifolium, which equally well illustrates the triune nature of the Godhead. The three distinctive leaflets are very beautiful and interesting, each being distinct, whereas the conventional shamrock is always represented, not as trifoliate, but as trilobate.

The genus is remarkable for a great number of highly

interesting forms, which are usually favourites with the gardener. There is, too, one species, *O. crenata*, which has tuberous roots, or rather its roots bear tubers; these have been esteemed as edible, but we confess that they are too soft and watery ever to merit attention like the potatoe.

The *Balsaminaceæ*—balsams—are interesting on account of the gay annual known as the balsam, which finds a place with equal favour in the greenhouse and in the cottage window, and more recently it is used as a showy bedding plant, for which its fine foliage and variously coloured gay flowers admirably suit it.

There is a species reputed a wild native, namely, the *Impatiens noli-me-tangere*, or touch-me-not, which possesses the power of contraction in the valves of the capsule to such a degree that the action throws out the seeds with considerable force. When the capsules are ripe a mere touch will cause this. Mrs. Lankester says—"The common English names of this plant, 'Quick-in-the-hand' and 'Touch-me-not,' will express its nature and its extreme irritability, which it has in common with the whole of the balsam tribe of plants." In our youth we used to grow varieties of these for this very action, and we found that the *I. noli-me-tangere* was sometimes so sensitive that passing the hand up the plant would cause all the ripe or partially ripe capsules to explode with a sudden click that made it charming as a surprise for our town cousins.

The structure of the balsam flower, with its peculiar spurred calyx, is quite a study; but for this purpose the double flowers of the house are not suitable, but the single ones of the garden impatiens may be studied with advantage.

The *Geraniaceæ*—cranesbills—though containing a comparatively few genera, is rich in species, as no less than five hundred have been described; and as these have a remarkable tendency to make varieties, the forms, colours, and markings of these showy plants afford the gardener some thousands of *sorts*, which are daily being added to.

The genera *Geranium* and *Erodium* are well represented by some pretty native flowers, while it is to the *Pelargonium* that we must look for the immense number of garden varieties. The *G. Robertianum*, the common "Herb Robert" of every hedge, is a beautiful little plant, and was once held in great repute for its many uses, especially in hurts and wounds. It is curious that its continental name should be so near our own; thus the French call it "*Geranium Herbe à Robert*," while the Germans give it

the appellation of "*Ruprechtskraut.*" In explanation of this we copy the following from 'English Botany:'

"The common name of this pretty plant is said to have originated in its being used to cure a disease called in Germany "Ruprechts Plage," very probably in allusion to Robert Duke of Normandy, for whom the celebrated medical work of the Middle Ages, the 'Ortus Sanitatis,' was written. The name occurs in a MS. vocabulary of the thirteenth century. In former times this herb had a considerable medical reputation, and was used as a vulnary and abstergent. It possesses, in common with its whole family, slightly astringent qualities, and, according to the doctrine of signatures, Sir John Hill informs us that its power to arrest bleeding is indicated by the beautiful red hue assumed by the fading leaves. In Wales it is still administered in medicine, and our never-failing friend Gerarde extols it as an excellent "stauncher of blood."* The whole order is remarkable for the varied hues which the leaves and also the flowers assume. The "zonale geraniums" of the garden—Mrs. Pollock, for example—have zones of white, green, purple, and yellow variously arranged, and the carmine flowers of many of the forms make them highly conspicuous and ornamental. The Cranesbills and Storksbills have much in common, being remarkably alike in properties. The musk-like flavour of *Erodium moschatum* is remarkable, but it is otherwise much like *E. cicatarium*, which latter should be looked to when its seeds are ripe, as the singular spiral appendages to the seeds have the property of coiling and uncoiling according to the state of the atmosphere; hence it is a delicate hygrometer, and is used by the country people to foretell the nature of the weather.

The *Pelargonium*.—Who shall depict the glories of this genus? Their blaze of beauty can only be equalled by the illustrious names of all countries which have been attached to them. Their connection with the Impatiens is sufficiently made out not only by structure but by qualities; hence the indication of a spur is sufficiently obvious, while their astringent nature is at once made sensible to the taste.

They have, however, no rank as medicines, though they are the glory of the greenhouse, the windows of the poor as well as the rich; and now with the prevailing system of bedding-out they make such a show of colour as indeed, where overdone, to have got for its beds the name of the "scarlet fever."

Of almost all hues from a negation of colour to dark

* New Edition, vol. ii, p. 205.

purple they are singularly varied, and no less are they so in their foliage than in their flowers, no less in their bunches or trusses of flowers than in general habit; so that we may look at the *Pelargonium—Geranium* of the garden—as one of the greatest floral favorites we possess, scarcely second indeed to the queen of flowers itself.

TYPHOID INFLUENZA.

By W. A. Cox, M.R.C.V.S., Dublin.

INFLUENZA, with its complications, is as much the *bete noir* or bugbear of the horse-owner as contago-infectious pleuro-pneumonia is of the stockman. We know that the direct loss is not so great, but indirectly it is very considerable, owing to the sick animals being incapable of performing their work. The disease also deteriorates their value, leaving behind it such serious consequences as roaring, nasal gleet, broken wind, and, in some cases, chronic disease of the lungs. These terminations are rarely seen in the simple form of disease, but are a frequent sequel to that form that has ravaged the country for the last eight or ten years.

Typhoid influenza is not a novel disease, but has long been known; its ravages, however, were so great at the period of which I speak as to draw especial attention to it. There was an alarming outbreak in Paris, and many animals succumbed to the attack; immediately after this it appeared in England, and had given to it the name of "French distemper," from its supposed origin.

Peculiarities.—Although I have called the disease influenza, it does not always show at the commencement the patent characteristics of that disease. It assumes different forms, attacking the lungs, the limbs, the brain, and the liver; occasionally all are affected.

Pathology.—It is a disease due to the introduction into the blood of a *ferment* which exercises on it a definite morbid action, altering its normal condition. This alteration first affects the mucous membranes, more especially that of the intestines, but the visible mucous membranes are also affected. There is an excessive acid secretion, and this is detectable in the breath of the animal. In the advanced stages the disease becomes infectious.

Causes.—The origin of this form of disease is obscure, probably it originated in the simple type and became aggra-

vated by adventitious circumstances, but many healthy animals are now affected from contact with diseased ones.

Symptoms.—Those observed by the man in charge are loathing of food and fluids, languor and listlessness, a stiff gait, and a torpid action of the bowels. We find a quickened, irritable, small pulse, an injected state of the visible mucous membranes, occasionally a discharge of tears from the eyes, and they are "gowled;" there is a ropy secretion in the mouth and sometimes slavering the fæces are small, light coloured, and coated with mucus. In some instances we have a cough, sore throat, and in a few a heavy thick discharge from the nostrils, but this rarely becomes purulent; and following this the lungs become affected and the breathing laboured. In other cases we find a stiff straddling gait, arched loins, and a difficulty in progression. In some the brain is affected, the animal staggers as he moves, or the nose is rested on the manger. Again, where the liver is affected, the visible mucous membranes are injected and of a dirty yellow hue; these symptoms are associated with those mentioned before, such as quick pulse, cough, &c. There are some neglected cases where the disease has increased in intensity; this is more especially the case in the pneumonic type.

Treatment.—In the earlier stages this is much simpler than is imagined, and should be more of a negative than of an active kind; the administration of alkalies, solution of sulphate of magnesia, Spts. Æth. Nit., Liq. Ammon. Acetas, or lime water, with occasional doses of oil; and where the throat is sore solution of extract of belladonna in union with some of the compounds of ammonia is advisable: where the lungs or throat are affected repeated applications of mustard or the use of blisters are indicated. Camphor vapour baths are useful to relieve the congested vessels; bleeding and the use of cathartics are contra-indicated.

Great attention should be paid to *hygiene*; the animal should be moved to a light, airy, roomy box, well ventilated; the body and extremities should be well clothed, the eyes sponged, the ears pulled, and the body cleaned two or three times daily; the bedding should be changed daily, and the animal moved into a convenient place, and the box disinfected with chlorine gas; in some instances it would be a good plan to rarefy the atmosphere by the method recommended by Mr. Greaves, that is, the lighting of coke fires; I have found this very successful in the pneumonic form. Diet should consist of small quantities of the best possible kind, giving a frequent change. Where great debility is present porter or stout may

be given, or even occasional doses of whiskey. I have often found beef tea or milk to be very beneficial.

The cause of the great fatality in town stables is the improper ventilation and overcrowding so often seen. Where animals are sick it is extremely difficult to get those in charge to give them plenty of "air." If this is neglected the chief condition of success in the treatment is lost.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of May, 1874, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Hamburg .	Hull . .	Foot-and-Mouth	1	...	...	...	1	1
„	London .	„	1	...	...	...	1	1
Oporto . .	„	„	34	...	...	...	34	34
Total			36	...	...	...	36	36

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 15th June, 1874."

CATTLE PLAGUE.

According to the reports which have been received from the Continent, there is no important change in the rate of prevalence of the cattle plague since the last summary was published. Hungary is still reputed to be free from the affection, but it prevails in several districts of Croatia and Sclavonia and the military frontier. Cattle plague also exists in the island of Naxos.

FOOT-AND-MOUTH DISEASE.

In many parts of the kingdom foot-and-mouth disease is spreading, and in some cases it has assumed a fatal character; but in the instances which have been investigated the fatality appeared to be due to bad management rather than to any specially virulent qualities of the disease. As far as our knowledge extends, the local authorities in most of the infected districts have made regulations under the recent Order of Council to prevent the spreading of the disease.

Facts and Observations.

Effects of Nitrous Oxide on Germination.—Juliet and Blanche contribute an article to *Les Comptes Rendus*, in which they discuss the character of nitrous oxide. They made a series of experiments by attempting to germinate seeds of different kinds on moist filter paper in an atmosphere of N_2O. The seeds refused to germinate, while other seeds of the same species germinated with perfect readiness in bell jars filled with air. Further, they found that the seeds in the N_2O atmosphere could easily be made to germinate if a few bubbles of oxygen were introduced. The conclusions reached are that the protoxide of nitrogen cannot support the respiration of plants or animals, and that, if it produces anæsthesia, it does so by preventing the oxygenation of the blood, *i.e.* by producing asphyxia.—*English Mechanic*.

A Peculiarity of Capillary Blood.—Dr. F. Falk, of Berlin, observes that several years ago Virchow pointed out that the blood contained in the dead body was capable of division into two parts, of which one was susceptible of coagulation when exposed to the atmosphere, whilst the other appeared to be insusceptible of coagulation. In the most recent edition of the "Cellular-pathologie" Virchow again returns to the subject, and declares that, whilst the blood contained in the heart and great vessels coagulates, that which is contained in the capillaries will not coagulate. Dr. Falk has made a careful series of experiments on the blood of man and the horse in regard to this point, and has arrived at the following conclusion:—That the idea of a diminution in the amount of fibrino-plastic substance in capillary blood is not admissible, but that there is good reason for believing its indisposition to coagulate is due essentially to its containing a smaller amount than natural of the fibrinogenous substance, and in part also to a diminution in the amount of the ferment which Schmidt's recent researches seem to demonstrate is requisite for coagulation to take place.

Artificial Arrest of the Growth of Long Bones by Irritation of the Epiphyses.—Alfred Bidder (*Archiv f. exper. Pathol. und Pharmacol.*, 1873, i, 248) gives the details of some experiments he has made upon the superior epiphysial cartilage of the tibia of young rabits. The cartilage was, in some instances, exposed, and needles were inserted into it; in others it was destroyed by section. It was observed that the growth of the bone in length was arrested either on one side only or over the whole extent of the terminal surface, according to the part irritated, and this effect was marked throughout the whole length of the bone as far as to the distal epiphysis. If the destruction of the cartilage took place on the fibular side, the growth of the opposite side caused the bone to become curved with its convexity inwards. No such effect was, however, observed if, instead of the exact line of junction of the epiphysial cartilage, the needle had been introduced into the bone on either side. The effects produced, as seen under the microscope, varied with the severity of the irritation. When this was slight there was only a slight increase in the ordinary processes of ossification, but when the injury was severe the regular arrangement and development of the cartilage-cells was interfered with, showing that this tissue took an active part in the pathological processes induced; irregular points of ossification soon appeared, and the bony union of the epiphysis and shaft was expedited.

THE VETERINARIAN, JULY 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

EXAMINATION OF CANDIDATES FOR THE OFFICE OF PORT INSPECTOR.

IT has already been notified in the *Veterinarian* that two vacancies in the list of Inspectors in the Veterinary Department of the Privy Council would be filled up by competitive examination, the only method, in fact, which appeared to offer a fair opportunity of selecting the best of the several candidates who, in point of experience and professional skill, might be considered as nearly on an equality.

Fifteen candidates presented themselves before the Court of Examiners, which was composed of the Principal of the Royal Veterinary College, the Chief Inspector in the Veterinary Department, and the Dean of the College of Preceptors. For the reasons which have been given it was absolutely necessary to establish a high standard of professional efficiency, in addition to educational acquirements, and it was probably on this account that only a comparatively small proportion of the total number of candidates was submitted to the Lord President as being competent for the office.

We are now able to announce that the following appointments have been made, viz. Mr. H. J. Hancock, jun., to Thames Haven and Mr. W. C. Lawson to Liverpool. These selections will fill the vacant offices; but we believe that it is intended to appoint inspectors at other of the ports for the purpose of making a careful inspection of the landing places for cattle and of the vessels which are engaged in the cattle trade, with the view to the effective working of the provisions of the transit order, more particularly in reference to the prevention of contagious and infectious diseases.

It will be seen by reference to our "Parliamentary Intelligence" that Lord Sandon stated in the House that communications had taken place with the Treasury in respect

of these appointments. Under these circumstances we feel justified in advising members of the profession who desire to devote themselves to the work of inspection to forward their names to us without delay, that we may be in a position to act with promptness if the occasion should suddenly arise. For the guidance of intending candidates we may state that the last examination may be taken to represent the system that will be adopted in future. The following is a copy of the written examination from a paper set by the Dean of the College of Preceptors:

EDUCATIONAL EXAMINATION.

Time allowed, three hours.

[N.B.—Credit will be given for clear and legible hand-writing.]

1. Write out and punctuate the passage dictated by the Examiner.

2. Make a table of the nouns and verbs in the first two sentences of the extract, arranged under the following heads:

Nouns		Verbs	
Proper	Common	Transitive	Intransitive

3. State briefly the rules for the use of Capital letters, and for the punctuation of sentences, in English.

4. Write a short report to the Secretary of the Veterinary Department of the Privy Council, as full as you can make it within an hour, on the following case:

> A vessel from Hamburg arrives at Harwich with some cattle suspected to be diseased, which you are required to inspect. Report on the diseases you have found among them, the steps you have taken for their examination and detention, and generally for carrying into effect the Orders of Council relating to the importation, landing, and transit of foreign animals.

5. Name six ports in the United Kingdom at which cattle can be landed under the "Foreign Animals Orders" of the Privy Council, and the county in which each is situated.

6. From what parts of Russia are animals chiefly imported into England, and by what routes and ports are they usually brought to this country?

7. Name the rivers of Germany which fall into (i) the Baltic Sea, (ii) the German Ocean; with one or two towns on each.

The more strictly veterinary portion of the examination had reference principally to the pathology of Cattle plague, Pleuro-pneumonia, Foot-and-mouth disease, Sheep-pox, Sheep-scab, and Glanders, and the laws which govern the spread of each of these diseases. The practical section of the examination included the use of the thermometer and microscope, and the necessary manipulations to be employed in examining animals in order to detect the existence of contagious and infectious maladies.

We have only to add that any of the candidates who did not succeed in reaching the fixed standard will be admitted to a second examination on the subjects in which they failed if they seek the appointments alluded to, and that no extra fees will be required of them for this re-examination. Fresh candidates will have to pay a fee of one guinea.

Extracts from British and Foreign Journals.

REPORT ON THE ORIGIN AND PROGRESS OF THE EPIZOOTIC AMONG HORSES IN 1872, WITH A TABLE OF MORTALITY IN NEW YORK. (Illustrated with Maps.)

By A. B. Judson, M.D., Assistant City Sanitary Inspector.

(*Continued from* p. 365.)

Among the earliest records of the epizoötic of 1872-73 is the following telegraphic dispatch, dated at Toronto, Canada, October 4, 1872, and printed in the *Montreal Gazette*: "A terrible disease has made its appearance among horses here. Many horses have taken sick and died within a few hours." Its earliest appearance at Toronto was on September 30th, when a group of fourteen cases was observed in one stable by Andrew Smith, Surgeon of the Ontario Veterinary College at Toronto.

The best accessible information in regard to the place of origin of the disease is contained in the following extract from a letter written by Dr. Andrew Smith, December 7, 1872: "As far as I can ascertain, the disease originated in this district, and generally extended in every direction. It appeared in the neighbourhood of Barrie, Collingwood, and

Owen Sound, all of these places being situated north-west of this city, in from eight to fourteen days after the malady broke out here. . . . In conclusion, I may again state that, from recent inquiries, I am convinced the disease first appeared in this neighbourhood."

From Toronto the disease spread towards all points of the compass. By the middle of October it had been recognised in all the cities of Canada. Its appearance at Halifax, Nova Scotia, was delayed till about the middle of November. Prince Edward Island remained entirely free from the disease.

Its first appearance in the United States was at Niagara Falls, where it was recognised October 11th. It soon spread over the Middle States and New England, and by the end of October it had appeared as far south as Norfolk, Va., and as far west as Chicago, Ill. Its appearance in a city was followed by the gradual withdrawal of horses and mules from the streets, until the busiest thoroughfares assumed the stillness of the Sabbath. Serious inconvenience to all classes of the community was thus occasioned. Dealers in provisions were unable to supply all their customers. Business men found it difficult to reach their offices by reason of the withdrawal of stages and horse-cars. Those branches of industry that depend essentially on the use of horses or mules were entirely arrested. In San Francisco it was stated that the disabling of 3000 horses had thrown out of employment from 5000 to 10,000 men. In San Francisco, as well as in many Eastern and Southern cities, oxen were introduced from the country, and were used in the transportation of goods. Large quantities of goods accumulated in factories, freight-depôts, and warehouses.

As the disease spread gradually through the Southern and Western States, it showed the same symptoms, caused, so far as can be ascertained, the same mortality, and produced the same derangement in business. At Cairo, Ill., and Savannah, Ga., the price of drayage was doubled. Farmers had difficulty in getting their produce to market, and the movement of the cotton-crop was retarded.

Having traversed the eastern half of the breadth of the continent by the middle of December, the disease invaded successively the states and territories of the far West. The people of this region were greatly embarrassed by the effects of this epizoötic. Relying exclusively on transportation by horses and mules, many settlements and military posts were, for a time, entirely deprived of even mail communication. Having made comparatively rapid progress along the line of

the Pacific Railway, the disease appeared in California in April, 1873. It then traversed the State of Oregon and Washington Territory, and, moving slowly through these comparatively unsettled regions, it reached British Columbia in July, 1873.

This epizoötic exhibited, in Cuba, Mexico, and Central America, the same characteristics which it had borne in Canada and the United States. It appeared at Havana about the middle of November, 1872, and at Santiago de Cuba about the middle of January, 1873, passing over the island from west to east in about two months. During those two months it was passing from east to west in the middle portion of the United States.

The disease crossed the Mexican border in February, and, having travelled over Mexico, was recognised in Guatemala in July, and in San Salvador in August.

A brief account has thus been given of the remarkable course pursued by this epizoötic. The detailed history of its progress, which follows, will bring to light certain interesting points in its career, and will put on record the evidences which will be demanded by those whose theories of its method of conveyance are not sustained by the facts.

The facts derived from newspapers have been obtained by examining the successive daily issues of the papers of the city in question, and making *verbatim* extracts from those issues which afforded information in regard to the date of the appearance of the disease, or other points of interest. In this way, a mass of manuscript was collected, from which many of the facts presented below were drawn. I am indebted to the kindness of George P. Rowell, Esq., whose newspaper files have been at my service. For many facts of importance and interest, I am indebted to those consular representatives who have courteously answered my inquiries, and to the favours of other correspondents.

In the following detailed history the names of many cities and towns are accompanied only by the date, or approximate date, at which the disease appeared in an epizoötic form. In other instances, extracts from the best accessible authority are given more or less fully according as they throw light on the nature of the disease, or assist in determining important dates.

Canada.

Toronto, September 30, 1872. Letter from Andrew Smith, Surgeon of the Ontario Veterinary College, Toronto, November 20, 1872: "The disease first appeared in this district in

an epizoötic form about the end of September, although possibly a few isolated cases may have existed a short time previous. On Monday, the 30th of September, I found fourteen horses affected in one stable, and, in three days afterwards, I am confident that three fourths of all the horses in this district were affected. By the middle of October the malady had, in a great measure, run its course, and by the end of the month most of the horses were convalescent. For some time quite a number of animals suffered from œdematous swellings of the legs, belly, head, &c., generally the result of hard work and exposure, and a few cases terminated fatally."

Barrie, *Collingwood*, and *Owen Sound*, second week in October. (*See* Dr. Andrew Smith's letter of December 7.)

Guelph, second week in October.

Stratford, second week in October.

Brantford, second week in October.

London, second week in October.

Goderich, third week in October. The *Goderich* (weekly) *Star*, October 11, 1872: "Owners of horses in this neighbourhood should keep a look-out for it, for it is likely to spread." October 25th: "Last week it broke out in Goderich."

Peterboro, second week in October.

Port Hope, second week in October.

Bobcaygeon, second week in October.

Belleville, second week in October.

Kingston, October 18th. The *Daily News*, October 18, 1872: "As yet we have not heard of its visitation to Kingston or vicinity." October 19th: "The contagion has at length reached Kingston."

Ottawa, second week in October. *Daily Citizen*, October 12, 1872: "The fatal disease which has made such havoc amongst the horses of Toronto has made its appearance at Ottawa." October 21st: "There are not fifty horses in the city free from the disease."

Montreal, October 8th. Letter from D. McEachran, M.R.C.V.S., Montreal, May 27, 1873: "Referring to my case-book, I find the record of the first case under date October 8th. . . . On the following day two other horses in the same stable, four others in that of a neighbour, in all, that day, about a dozen cases. Each day it gradually increased, till on Monday, 14th, we had very few horses unaffected." The *Gazette*, October 16, 1872: "Owing to the prevalence of the horse disease, the city passenger-cars will partially cease running for a few days."

Quebec, October. *Morning Chronicle*, October 28, 1872: "Epizoötic influenza is spreading among the horses of this city. Upward of one hundred cases are calculated to exist." "October 30th: Yesterday over four hundred cases were reported."

St. John, New Brunswick, second week in October. An article by M. P. Greene, M.R.C.V.S., of St. John, N.B., published in the April number of the *Veterinarian*, London, 1873, vol. xlvi, p. 250: "On the 13th (of October) there was not a single horse, in the stable of thirty-two, free from the disease. . . . On the 16th (October) there was scarcely a horse to be seen in the streets that did not show signs of the distemper by coughing and a discharge from the nostrils." *Daily News*, October 28, 1872: "Business is very much embarrassed for want of means to move goods."

Halifax, Nova Scotia, November. *Morning Chronicle*, November 4, 1872: "Reports of the horse disease appearing here are current. So far as we can learn, they are unfounded." November 19th: "There seems no reason to doubt that the disease is now in Halifax."

Prince Edward Island, exempt. The *Patriot*, October 31, 1872: "We have not heard that the 'catarrhal fever,' as it is called, has yet made its appearance on this island." Letter from David Laird, editor of the *Patriot*, Charlottetown, P.E.I., May 26, 1873: "I have received your letter of inquiry respecting the epizoötic on this island. It did not reach Prince Edward Island. At the time the disease was raging in the other provinces, the navigation was closed, and our island entirely cut off, in the way of export or import, from the mainland, which fact must have been the reason it did not cross to our shores."

New York.

Niagara Falls, October 10th. (*See Buffalo.*)

Buffalo, October 13th. *Buffalo Commercial Advertiser*, October 15, 1872. Letter from William Somerville, veterinary surgeon: "The epidemic has now made its appearance on this side of the line, and in a very virulent form. On Friday last (October 11th) I was called by telegraph to the Falls to see several sick horses. Upon examination . . . I pronounced it the same disease as that by which the Canadian horses were affected. . . . And now the disease has got amongst our horses in Buffalo." October 18th: "The disease . . . is spreading throughout the city." October 25th: "As every horse in the city is now affected with the disease, it can of course go no further."

Rochester, third week in October. *Daily Union and Advertiser*, October 18, 1872: "The malignant disease . . . which appeared a few days since in Buffalo has broken out among the horses in this city." October 22nd: "The running of the street-cars was totally abandoned this morning."

Syracuse, October 19th. *Daily Journal*, October 22, 1872: "On Saturday of last week (October 19th) the disease made its appearance in this city, being noticed first in some Canadian horses shipped to this city."

Utica, fourth week in October. *Morning Herald*, October 28, 1872: "There has been as yet . . . no real case of the horse disease in this city." October 30th: "The horses which have been attacked . . . amount . . . to about one hundred." November 1st: "Yesterday there was a scarcity of vehicles on the street."

Oswego, fourth week in October.

Watertown, fourth week in October.

Ogdensburg, October 21st. Letter from M. E. Thomas, veterinary surgeon, Ogdensburg, November 22, 1872: "The epidemic of influenza first made its appearance here in the stable of the Spencer House, four horses coming down with the disease the *same day*, within a *few hours* of each other. This was on Monday, October 21st. Saw the next case four days subsequently to the attack of the Spencer House horses, six blocks away, and another case on the same day (October 25th). On the 30th of October I had seventeen new cases. New cases followed every day."

Albany, October 23rd. *Evening Journal*, October 28, 1872: "Ever since the first case was reported, on Wednesday (October 23rd), it has steadily increased." November 1st: "There can scarcely be a well horse in the city."

Schenectady, fourth week in October.

Saratoga Springs, fourth week in October.

New York City, October 21st. (*See* Prof. Liautard's Report.)

Poughkeepsie, fourth week in October. *Daily Eagle*, October 25, 1872: "A close inquiry fails to reveal any case of the horse disease in this city." October 28th: "The dreaded horse disease . . . has at last reached Poughkeepsie."

Kingston, November 1st. The *Daily Freeman*, November 2, 1872: "The horse disease seems to have certainly reached us at last, a number of cases being reported yesterday."

Elmira, fourth week in October.

Jamestown, fourth week in October.

Binghampton, Ithaca, Port Jervis, Nyack. An article by Prof. James Law, M.R.C.V.S., of Cornell University, Ithaca,

N.Y., published in the February and April numbers of vol. xlvi of the *Veterinarian*, London, 1873: "Yet it only showed itself in Binghampton, N.Y., on October 28th; in Ithaca, still farther north, on October 31st; at Titusville, Penn., and Port Jervis, N.Y., on October 29th; at Nyack, N.Y., on October 30th; at Kingston, N.Y., on November 1st; and at Scranton, Pa., on November 13th."

Connecticut.

Waterbury, October 27th. *Daily American*, October 26, 1872: "Thus far we have heard of no case of the epidemic in this city." October 28th: "The horse distemper, known as the epizoötic . . . has broken out in this city. It first appeared . . . Sunday morning, October 27th."

Norwich, October 23rd. *Daily Advertiser*, October 25, 1872: "The first case was discovered . . . Wednesday morning, October 23rd."

New Haven, fourth week in October.

Hartford, fourth week in October.

Rhode Island.

Providence, October 23rd.

Newport, fourth week in October.

Massachusetts.

Boston, October 20th. *Daily Advertiser*, October 24, 1872: "The first case reported was that of an animal . . . taken sick . . . on Sunday afternoon, October 20th. . . . Last night it was estimated that at least seven eighths of the entire number of animals in this city were suffering from the disease." October 16th: "Expressmen are unable to fill their orders, and the warehouses were yesterday filled with goods awaiting shipment."

Springfield, October 22nd. *Daily Republican*, October 24, 1872: "It broke out yesterday, or, more properly speaking, Tuesday afternoon, October 22nd, though no one recognised the disease till the following day. A few horses commenced coughing in the afternoon, very lightly at first, but by morning every one of the sixty horses in the barn was affected, and such a coughing, wheezing, and blowing of noses, no horseman ever heard before."

Worcester, October 27th. *Daily Spy*, October 24, 1742: "The horse disease . . . has not yet made its appearance in this city." October 28th: "Nothing serious happened until yesterday, when a number of horses kept in the same stable were all found to be coughing."

Fall River, fourth week in October.
New Bedford, fourth week in October.

Vermont.

Burlington, October 26th. *Free Press and Times*, October 28, 1872: "The epizoötic made its first appearance in this city on Saturday" (October 26th).

Rutland, November 3rd. *Daily Herald*, October 31, 1872: "No symptoms of the epizoötic as yet." November 7th: "Sunday morning (November 3rd) suddenly, without any premonitory symptoms, the disease broke out."

St. Albans, fourth week in October.

New Hampshire.

Concord, last week in October.
Nashua, fourth week in October.
Portsmouth, October 23rd.

Maine.

Bangor, third week in October.
Bath, October 28th.
Portland, fourth week in October.

Pennsylvania.

Philadelphia, October, 26th. *Press*, October 25, 1872: "Philadelphia has not yet been reached." October 26th: "The disease has not yet reached Philadelphia." October 29th: "The Canadian horse disease reached Philadelphia on Saturday morning" (October 26th). *Evening Telegram*, November 5th: "There is an almost entire absence of horses from our streets." *Evening Bulletin*, November 6th: "At the various railroad depôts and piers, freight is rapidly accumulating, and heavy losses are being incurred."

Harrisburg, fourth week in October.
Lancaster, fourth week in October.
York, last week in October.
Erie, fourth week in October.
Corry, fourth week in October.

Pittsburg, October 29th. *Commercial*, November 1, 1872: "The disease first appeared on Tuesday evening" (October 29th).

Meadville, November 2nd. *Evening Republican*, November 4, 1872: "The first evidence of the disease in this city was noticed . . . Saturday (November 2nd), but up to the present time the symptoms generally noted have not appeared, and it is still doubtful whether this is a case of the epizoötic."

November 5th: "There seems to be no doubt now that the disease has reached this city."

Titusville, October 28th. *Morning Herald*, October 30, 1872: "Horses commenced coughing on Monday afternoon and evening" (October 28th).

Bethlehem, first week in November.

Easton, first week in November.

Reading, first week in November.

Williamsport, first week in November. *Daily Gazette and Bulletin*, November 6, 1872: "For the past week the horsemen of this city have been looking for the appearance of the prevailing epidemic . . . We have reliable information that there are several cases in the city."

Pottsville, first week in November. *Miners' Daily Journal*, November 11, 1872: "We had hoped that this region would be spared. . . . During the latter part of last week, two or three isolated cases were reported from different parts of town, and, on Saturday evening (November 9th) and yesterday, it became apparent that the disease, in an epidemic form, had arrived."

Scranton, November 13th. (*See Binghampton*, N.Y., page 497).

New Jersey.

Trenton, November 2nd. *Daily State Gazette*, October 29, 1872: "There is no case in the city." November 4th: "Yesterday the disease spread with great rapidity, some seventy-five animals having taken the disease since Saturday" (November 2nd). November 8th: "Our streets yesterday were almost entirely deserted . . . There is scarcely a horse in the whole city that is not more or less affected."

Delaware.

Wilmington, November 5th. *Daily Commercial*, November 4, 1872: "Careful inquiry made in all directions over the city this morning failed to discover any case of the prevailing horse epidemic." November 6th: "It has been a matter of much comment that Wilmington has so long escaped . . . Thirteen cases are reported."

Maryland.

Baltimore, October 25th. *American*, October 29, 1872: "There are now hundreds of horses 'on the sick list' in Baltimore, suffering from some sickness which only made its appearance on Friday or Saturday" (October 25th or 26th). *Gazette*, November 5th: "Impossible to get transportation

for the ordinary wants of trade." November 11th: "During the past few days quite a number of horses have died."

District of Columbia.

Washington, October 28th. *Morning Chronicle*, October 29, 1872: "Several horses are suffering from a very severe cold, but no symptoms of the general epidemic have made themselves manifest." October 31st: "There are at least forty cases of the horse disease now in Washington." November 7th: "The streets are almost deserted."

Virginia.

Norfolk, last week in October. On October 30, 1872, the Board of Health resolved: "That the health officer be instructed to give public notice that all steamers and other vessels arriving from Baltimore and points north of that city shall be subject to quarantine in all cases when such steamers or vessels shall have horses on board." *Journal*, October 31st: "We have little doubt that the dreaded malady is among us." November 1st: "There cannot be less than fifty or sixty sick horses in this city." November 3rd: "The absence of cars from the streets was the subject of general comment . . . In every stable where there are horses and mules together, both are affected alike."

Richmond, last week in October.

Lynchburg, second week in November. *Virginian*, November 12, 1872: "The horse disease also made its appearance, and tended to mar the interest of the performances" (horse-race on November 11th). "Some of the horses showed evident signs of the epidemic." November 16th: "A *post-mortem* examination was made. The lungs were found in a high state of congestion, and the throat and all the respiratory organs much diseased."

West Virginia.

Parkersburg, second week in November. *Daily Times and Gazette*, November 25, 1872: "Very few horses are to be seen . . . Ox-teams supply their places."

Wheeling, November 13th. *Intelligencer*, November 14, 1873: "Yesterday some twelve or fifteen horses showed symptoms of it in the first stage."

Ohio.

Steubenville, November 15th. *Daily Herald*, November 18, 1872: "The disease made its appearance in this city Friday evening" (November 15th).

Cincinnati, November 8th. *Commercial*, November 10, 1872: "The first appearance was . . . . on Friday night" (November 8th). *Times and Chronicle*, November 18th: "The horse has almost entirely disappeared from the streets, the ox becoming more and more the chief reliance for transportation."

Columbus, November 16th. *State Journal*, November 18, 1872: "The first symptoms were observed on Saturday morning" (November 16th).

Zanesville, November 16th. *Daily Courier*, November 19, 1872: "The first cases of the disease . . . were developed . . . on Saturday last" (November 16th).

Dayton, second week in November.

Springfield, third week in November. *Daily Republic*, November 29th: "A Sunday quiet prevails upon the streets."

Cleveland, fourth week in October.

Sandusky, second week in November.

Toledo, second week in November.

Indiana.

Indianapolis, November 17th. *Journal*, November 19, 1872: "The first authentic case was attacked Sunday night" (November 17th).

Fort Wayne, third week in November.

Lafayette, third week in November.

Terre Haute, fourth week in November.

Evansville, November 21st.

Madison, last week in November.

Michigan.

Detroit, about October 16th. *Tribune*, October 23, 1872: "The disease has already made its appearance, showing itself first about a week ago."

Port Huron, third week in October.

East Saginaw, October 24th. *Daily Courier*, October 26, 1872: "Attention was first drawn to the horses first seized on the morning of Thursday" (October 24th).

Adrian, second week in November.

Jackson, November 7th. *Daily Patriot*, November 12, 1872: "The first symptoms appeared on Thursday" (November 7th).

Kalamazoo, November 9th. *Daily Telegraph*, November 11, 1872: "Last Saturday afternoon (November 9th) the first case occurred here."

Grand Haven, November 8th. *Daily Herald*, November 8,

1872: "This unaccountable disease broke out in Grand Haven this (Friday) morning."

Illinois.

Chicago, October 29th. *Daily Tribune*, October 30, 1872: "We are informed by a gentleman that there are eight horses afflicted with a disease, resembling that which played such havoc in the East, at No. 612 West Jackson Street, and twenty-two others at No. 609 West Madison Street. Our informant says that, on the 20th instant, there were brought to this city from Canada ten horses. The animals were stabled at No. 612 West Jackson Street. Four or five days after their arrival eight of them were taken sick; to save the other two, they were removed to No. 609 West Madison Street. At the time of their transfer these two horses were perfectly well to all appearances, but on Saturday or Sunday last (October 26th and 27th) they showed symptoms of the 'Canada disease,' and with them twenty other horses." The same paper, of October 31st, states that the horses above referred to were examined, on October 30th, by two veterinary surgeons, by order of the Sanitary Superintendent, and adds: "After having thoroughly examined each horse, they pronounced the malady to be the epizoötic . . . Over three hundred horses in Chicago . . . are sick with the horse disease." November 4th (Monday): "Chicago must do without horses this week."

Cairo, first week in December. *Bulletin*, December 5, 1872: "Yesterday business began to feel its effects. Drayage, which usually costs two dollars and a half, doubled its price yesterday."

Quincy, December 8th. *Daily Herald*, December 10, 1872: "It arrived Sunday" (December 8th).

Peoria, November 27th. *Daily Transcript*, December 2, 1872: "Although it seems to have made its appearance no longer ago than last Wednesday (November 27th) nearly every horse in the city is at present more or less affected by it."

Bloomington, third week in November.

Galesburg, fourth week in November.

Galena, November 20th. *Evening Gazette*, November 21, 1872: "Yesterday morning there was not a case of the new horse disease in Galena. Last evening a few cases came to light."

Iowa.

Davenport, November 14th. *Daily Democrat*, November 16, 1872: "On Thursday night (November 14th) five horses

belonging to . . . were taken with a violent coughing, and appeared to have a cold in the head. Yesterday several horses were attacked with the same symptoms, and this morning all the horses in his stable, to the number of forty, were coughing."

Keokuk, November 25th. *Daily Constitution*, November 26, 1872: "Yesterday this disease made its appearance."

Dubuque, third week in November.

Iowa City, third week in November.

Muscatine, fourth week in November.

Burlington, last week in November.

Des Moines, fourth week in November.

Nebraska.

Omaha, December 1st. *Daily Bee*, December 3, 1872: "The epihippic was reported as having made its appearance in this city on Sunday (December 1st), but we were unable to find any cases till this morning." December 9th: "Nearly every horse in the city is a victim."

Lincoln, first week in December.

Nebraska City, first week in December.

Wisconsin.

Milwaukee, first week in November. *Daily News*, November 5, 1872: "The epidemic has reached this city." November 13th: "Many of our merchants have resorted to ox-teams."

Janesville, second week in November.

Madison, third week in November.

La Crosse, fourth week in November.

Green Bay, second week in November.

Fon du Lac, third week in November.

Minnesota.

St. Paul, third week in November.

Dakota Territory.

Yankton, December 5th. *Press* (weekly), December 11, 1872: "The disease first made its appearance here last Thursday" (December 5th).

Vermilion, first part of December. *Republican* (weekly), December 12, 1872: "The stage has come in for the last two or three days drawn by oxen."

Kentucky.

Louisville, November 9th. *Courier-Journal*, November 11,

1872: "On Saturday night (November 9th) a number of horses . . . were observed to be slightly ailing, and yesterday morning their cases had developed into what is in all probability the famous epizoötic." November 16th: "From reports in the West End, it is safe to say that at least a hundred deaths from the disease have occurred in that section . . . About twenty deaths were reported last night among the mules in the Louisville City Railway Stables."

Paducah, fourth week in November.

Tennessee.

Memphis, third week in November.

Nashville, third week in November.

Chattanooga, third week in November. *Daily Times*, November 28, 1872: "The epizoötic made Market Street yesterday more quiet than it usually is on Sunday."

Knoxville, fourth week in November.

North Carolina.

Raleigh, first week in November.

Charlotte, fourth week in November. *Daily Observer*, November 30, 1872: "First, the horses are seized with coughing, followed by a running at the nose, and chilliness."

New Berne, fourth week in November.

Wilmington, November 12th. *Daily Journal*, November 14, 1872: "It first made its appearance here on Tuesday" (November 12th). November 19th: "On the wharves scarcely a horse is to be seen, and business has consequently received a sudden and severe check."

South Carolina.

Charleston, first week in November. *Daily News*, November 4, 1872: "The dreaded malady has found some foothold in our city." November 5th: "A majority of the work horses and mules of the city are more or less affected."

Columbia, second week in November.

Georgia.

Savannah, second week in November. *Daily Republican*, November 7, 1872: "A special meeting of the Cotton Exchange, Tuesday (November 5th), took into consideration the importance of providing a measure of relief for our commerce, should the fearful horse disease make its appearance and lay up our teams." November 19th: "Saturday night

(November 16th) developed the fact that, so rapid had been its progress, the cotton could not be hauled through the city, . . . and the price immediately went up (from fifty cents) to one dollar per bale."

Augusta, third week in November.

Atlanta, third week in November.

Macon, fourth week in November.

Rome, last week in November.

Columbus, fourth week in November. *Daily Sun*, December 1, 1872: "Oxen are now employed by several of our merchants in draying."

Florida.

Jacksonville, fourth week in November. *Weekly Florida Union*, December 5, 1872: "Many of the farmers are greatly retarded in bringing their fall crops into market, on account of the malady."

Lake City, fourth week in November.

Marianna, first week in December. *Weekly Courier*, December 19, 1872: "Many horses and mules . . . have died from the effects of the epizoötic."

Tallahassee, first week in December.

Middle Florida, winter of 1872-73. (*See Key West.*)

Key West. Exempt. *Weekly Dispatch*, December 21, 1872: "No epizoötic at Key West as yet, but we are expecting it." May 24, 1873: "Key West has been singularly exempt from this disease. It has prevailed extensively on the mainland, particularly in Middle and portions of East Florida, during the last winter."

Alabama.

Mobile, fourth week in November. *Daily Register*, November 30, 1872: "The symptoms were the oft-described ones of wheezing, sneezing, and running at the nose, weeping at the eyes, and a strong inclination to fight off the cough, which, when it came, seemed to rack the beast from end to end."

Montgomery, fourth week in November. *State Journal*, December 1, 1872: "Transportation is seriously deranged."

Selma, fourth week in November.

Mississippi.

Natchez, fourth week in November.

Vicksburg, fourth week in November.

Louisiana.

New Orleans, November 25th. Report of S. S. Herrick,

M.D., Sanitary Inspector, in the Annual Report of the Board of Health, for 1872: "The earliest access of the distemper learned was November 21st; but of this there may be some doubt, as no other cases occurred until the 25th."

Shreveport, second week in December.

Texas.

Galveston, fourth week in November. *Daily News*, November 29, 1872: "This dread disease is certainly upon us."

Houston, November 29th. *Daily Telegraph*, November 30, 1872: "Yesterday there were thirteen cases of a serious disease among the horses of this city." December 8th: "There is a complete stagnation of freight, . . . for lack of drayage."

San Antonio, January 3, 1873. *Daily Express*, January 3, 1873: "The 'epizoötic' disease among horses is now here." January 9th: "What shall we do without mails? is the question asked on every hand. . . . All the coaches have been withdrawn."

Brownsville, third week in February. *Daily Ranchero*, February 23, 1873: "The much-dreaded epizoötic is prevalent here." February 28th: "It is reported that the mail route between here and Corpus Christi lost seventeen animals last trip."

Arkansas.

Helena, third week in November.

Little Rock, last week in November.

Camden, December 7th. *Weekly Journal*, December 12, 1872: "Several horses on Saturday and Sunday last (December 7th and 8th) developed unmistakable symptoms."

Fort Smith, third week in December.

Missouri.

St. Louis, December 1st. *Missouri Democrat*, December 3, 1872: "Saturday (November 30th), there was not a single case in St. Louis, but by Monday (December 2nd) over twenty were reported." December 10th: "It is difficult to procure carriages, or even a hearse for a funeral." December 13th: "The difficulties attending the transfer and delivery of freight at present . . . are of the most momentous character."

Hannibal, second week in December.

Kansas City, first week in December. *Bulletin*, December 7, 1872: "All the animals attacked had a cough, sore throat, and fever, with generally a running at the nose."

St. Joseph, December 14th. *Daily Gazette,* December 17, 1872: "On Saturday last (December 14th) the first symptoms were discovered."

Kansas.

Fort Scott, second week in December.
Lawrence, second week in December.
Leavenworth, second week in December.
Topeka, second week in December.

Colorado Territory.

Denver, fourth week in December. *Tribune,* December 30, 1872: "The epizoötic is now upon us." January 4, 1873: "The withdrawal of horses from the streets is almost universal."

Central City, fourth week in December. *Daily Register* January 11, 1873: "Trade is suffering greatly for the want of transportation."

Pueblo, first week in January. *Chieftain,* January 9, 1873: "At last the dreaded epizoötic has nabbed us sure. As yet, the symptoms are confined to coughing, and, in a few instances, the discharge of mucous matter from the nose."

Wyoming Territory.

Cheyenne, second week in January. *Daily Leader,* January 15, 1873: "There are only a few which show any signs of being affected." January 18th: "The epizoötic is on the increase."

New Mexico.

Cimarron, first week in January. *Weekly News,* January 4, 1873: "At last the epizoötic has reached us." January 11th: "It has been impossible to run a single coach since that arriving at Cimarron on the night of Friday, January 3d, and from that day to this not a single letter has left for the East, or arrived at our town from thence."

Elizabeth City, second week in January. *Railway Press and Telegraph* (weekly), January 15, 1873: "The epizoötic has reached this place. . . . The horses affected seem to be suffering from a severe cold, with running at the nostrils."

Albuquerque, fourth week in January. *Republican* (weekly) *Review,* January 18, 1873: "The epizoötic has not reached Albuquerque as yet." January 26th: "The epizoötic has reached this place."

Arizona Territory.

Prescott, first week in March. *Weekly Miner*, March 8, 1873: "The epizoötic, or animal pestilence, has at last reached this section of Arizona." March 22d: "At and near Fort Whipple all the animals are coughing, sneezing, and pining away."

Tuscon, second week in March. *Weekly Citizen*, March 15, 1873: "A majority of the horses and mules are afflicted . . . The stage animals westward are attacked. Eastward all seems right again."

Yuma, fourth week in March. *The Sentinel*, March 29, 1873: "Come at last. The epizoötic has made its appearance in our town."

Utah Territory.

Salt Lake City, second week in January. *Daily Herald*, January 14, 1873: "A number more of animals have been attacked with the disease since Saturday night (January 11th), and indications are that it is spreading." January 21st: "On acount of the epizoötic the street-cars will cease running regularly until further notice."

Corinne, third week in January. *Daily Reporter*, January 22, 1873: "Several cases of the epizoötic are reported this morning."

Idaho Territory.

Boise City, third week in March. *Tri-weekly Statesman*, March 22, 1873: "The epizoötic has reached this place, through the overland stage company's horses from the East."

Montana Territory.

Helena, fourth week in March. *Daily Herald*, March 26, 1873: "The epizoötic has made its appearance in our very midst. The entire stud of the Pacific Stables were to-day coughing and showing symptoms of the disease."

Nevada.

Winnemucca, middle of February. *Humboldt Register*, February 15, 1873: "It is reported that a few cases of epizoötic among horses are existing in the vicinity of Winnemucca." March 8th: "The epizoötic is raging among the horses at this place." (Humboldt, 40 miles west of Winnemucca.)

Gold Hill, first week in March. *Daily News*, March 5,

1873: "Epizoötic. This much-dreaded scourge of the horse family is beginning to manifest its presence in this vicinity."

Virginia City, first week in March. *Enterprise*, March 8, 1873: "It seems strange that so many horses should all at once be taken sick with colds." March 9th: "There can no longer be the slightest doubt that the much-dreaded epizoötic is here."

California.

Inyo, second week in March. (See *Bakersfield*.)

Bakersfield, third week in March. *Southern* (weekly) *Californian*, March 13, 1873: "The epizoötic has broken out in Inyo with great fury. . . Inyo caught it from Carson City. . . We can scarcely hope to escape it entirely." March 20th: "The epizoötic is now raging with great fury."

Santa Barbara, fourth week in March. *Times* (semi-weekly), March 30, 1873: "This much dreaded horse scourge has made its appearance in this place."

San Diego, first week in April. *Daily Union*, April 5, 1873: "About three days ago the first symptoms . . . made their appearance."

Visalia, third week in March. *Weekly Times*, March 22, 1873: "The epizoötic . . . has reached town."

Mariposa, second week in April.

Stockton, second week in April.

San José, second week in April.

Oakland, April 10. *Daily Transcript*, April 15, 1873, states that several horses were attacked on April 10th, and adds: "They were all attacked in the usual manner, slight shivering at first, then running at the nose, and other unmistakable evidences of the epizoötic."

Vallejo, third week in April.

San Francisco, third week in April. *Daily Morning Bulletin*, April 15, 1873: "The horses here have not yet been affected." *Daily Alta California*, April 19, 1873: "The epizoötic has reached the city." April 24: "The livery-stables still refuse to let out any of their stock at any price . . . Vegetable, milk, bread, and ice teams fail to make regular calls on their customers, and many are entirely neglected." April 25th: "All the horses on the city railroad cars are more or less affected, and on every line a number of cars have been drawn off." April 27th: "There has been considerable inconvenience the past few days, and a great deal of freight, in consequence, still remains in the business

houses." April 30th: "An extra number of ox-teams were brought into service yesterday by butchers and teamsters." May 2d: "Wells, Fargo & Co. (Express Company) commenced using oxen last night."

Sacramento, second week in April.

Marysville, second week in April. *Daily Appeal*, April 9, 1873: "The horses affected manifest the usual symptoms of a cough and profuse mucous discharges from the nose."

Nevada City, third week in April. *Daily Transcript*, April 16, 1873: "As yet we have heard of none in this city." April 17th: "The horse disease has made its appearance in our city."

Shasta, second week in April.

Weaverville, third week in April.

Yreka, third week in April.

Lava Beds, the seat of the Modock Indian war, fourth week in April. The *San Francisco Alta California*, of April 29, 1873, states, as part of the news from the seat of war, that "great inconvenience is suffered on account of the epizoötic, which has dismounted the cavalry."

Oregon.

Jacksonville, fourth week in April.

Baker City, April 8th. *Democrat* (weekly), April 9, 1873: "It is here! The horses of the Northwestern Stage Company in this city, and on the entire line from here to Boise City, have the epizoötic. It made its first appearance with their stock in this city yesterday morning."

Eugene City, third week in May.

Dallas, fourth week in May. *Weekly Mountaineer*, May 24, 1873: "The horse disease has made its appearance," May 31st: "We have heard of several deaths, but these have been brought about by severe driving."

Portland, fourth week in May.

Washington Territory.

Walla Walla, last week in April. *Union* (weekly), April 26, 1873: "We have none of it here, but feel the effects of it. We only get a tri-weekly mail." May 3d: "This terrible horse scourge has at last reached us." May 10th: "Nearly all the horses in town have it."

Olympia, May.

Steilacoom, first week in June. *Express* (weekly), June 5, 1873: "The epizoöty has at last reached this place, brought here from Olympia."

Seattle, third week in June.

British Columbia.

On the Main-land, July. Letter from David Eckstein, Esq., U. S. Consul, Victoria, B. C., November 15, 1873: "On the main-land the disease broke out, I believe, in July, and lasted about thirty days. A great number of horses and mules were attacked, mules as a rule severest, but in only two or three instances have fatal results occurred."

Vancouver's Island, exempt. Letter from David Eckstein, Esq., U. S. Consul, Victoria, B. C., November 15, 1873: "Victoria City, and in fact all of Vancouver's Island, remained unscathed by what is known as the epizoötic. Not a single case is known to have occurred here up to the present. For several months no horses or mules were allowed to be landed at the ports of Victoria, Burrard Inlet, or Nanaimo."

Cuba.

Havana, middle of November, 1872. Letter from Henry C. Hall, Esq., U. S. Vice-consul-general, Havana, August 9, 1873: "The disease did not become epidemic here until about the 20th of November, and from that time until the end of December it prevailed to such an extent as to seriously interfere with all business requiring the services of those animals (horses and mules) . . . The greatest mortality was among hack and stage horses, and the horses of the City Railroad." *Diario de la Marina*, December 11, 1872: "La hipodemia se ha generalizado tanto en los caballos de esta capital que ha empezado á causar algunos trastornos en el servicio de los carruajes públicos y particulares. Varios trenes han tenido que suspender la salida de los coches y algunas familias hacen uso de carruajes de alquiler. Aun en los mismos caballos de los vehículos que ruedan se nota gran tos y postracion, y muchos se caian ayer apénas salian de los trenes, quedando algunos muertos." (The epizoötic among horses is so prevalent in this city that it seriously interferes with public as well as private conveyances. Several lines have stopped their coaches, and some private families are using hired carriages. The horses that are kept in use suffer from cough and weakness, and yesterday many of them fell as they were led from the coaches, and some died.)

Letter from A. T. A. Torbert, Esq., Consul-general, Havana, June 26, 1873: "The disease was said to have been introduced by a span of American horses imported for the governor, which died soon after landing, but not until they had infected the stable they were kept in." Letter from Henry C. Hall, Esq., U. S. Vice-consul-general, Havana, August 27, 1873:

"Horses from the United States and Canada were imported into this island during the month of September, 1872."

Cienfuegos, latter part of December. Letter from John Sullivan, M. D, Cienfuegos, June 12, 1873: "The epizoötic appeared in Havana with very great intensity. Horses were seized with hard, dry cough, sneezing, glanders, and followed by extreme exhaustion, and frequently by death. In Cienfuegos, about the end of December, a few isolated cases appeared, but none of a severe or fatal character."

Santiago de Cuba, middle of January, 1873. Letter from A. N. Young, Esq., United States Consul, Santiago de Cuba, June 27, 1873: "The disease first made its appearance about the 15th of January, was at its height during February, and disappeared early in April. It was much more severe on horses in the city than on mules, and *vice versa* in the country. There were about one hundred (100) deaths among horses in the city; in one stable the loss was one in fifty, while another lost but one in forty. I witnessed the advent of the disease in Cincinnati in the early part of November last, and also here during the above-mentioned period. I do not think the horses suffered as much here during the attack as in Cincinnati, probably on account of the milder temperature here."

Hayti.—*Exempt.*

Letter from Ebenezer D. Bassett, Esq., *Port au Prince*, July 8, 1873: "The epizoötic has never yet made its appearance in this republic."

Letter from Louis Sanne, Esq., acting United States Consul, *Aux Cayes*, June 26, 1873: "The disease in question has not appeared yet here."

Letter from Stanislaus Goutier, Esq., United States Consul, *Cape Haytien*, June 26, 1873: "This disease has never made its appearance in Hayti."

San Domingo.—*Exempt.*

Letter from J. Ginebre, Esq., *Puerto Plata*, July 21, 1873: "The epizoötic has hitherto not appeared among the horses or mules of this island."

Letter from Fisher W. Ames, Esq., *Santo Domingo City*, June 13, 1873: "The disease is as yet totally unknown here. I have not seen a single case of any disease that even simulates it."

Jamaica.—*Exempt*

Letter from Thomas H. Pearne Esq., United States Con-

sul, *Kingston*, July 15, 1873: "The disease has not, to my knowledge, ever appeared here."

Mexico.

Monterey, first week in February, 1873. Letter from J. Ulrich, Esq., United States Consul, Monterey, June 21, 1873: "The epizoötic made its appearance here between the 1st and 10th of February last. It prevailed about one month in a very mild form, few deaths resulting. . . The mules of the stage company, attacked with the epizoötic, had each one a leather patch, about three inches in diameter, stuck on the centre of their foreheads with some adhesive substance. Few of them died, so, of course, that patch was an infallible remedy. . . At Saltillo, seventy miles west of Monterey, the disease prevailed also in a mild form. Saltillo has an altitude of over 5000 feet above sea-level, an altitude 3600 greater than Monterey."

Guaymas, March. Letter from A. Willard, Esq., United States Consul, Guaymas, June 19, 1873: "The epizoötic appeared at this place last March, its entrance to our place being distinctly marked in its march from Arizona."

Mazatlan, middle of March. Letter from Isaac Sisson, Esq., United States Consul, Mazatlan, July 11, 1873: "The epizoötic made its appearance in this city and neighbouring towns in March last, say, about the middle. It attacked horses, mules, and jacks, all about the same time. The disease was very mild as regards horses and mules, I do not know of a death; but, as to jacks, it was very fatal, a great many dying."

Manzanillo, March 19, 1873. Letter from A. Morrill, Esq., United States Consul, Manzanillo, September 28, 1873: "The first case of the real disease appeared on the 19th of March." July 8, 1873: "The disease was general, very few horses, mules, or asses, escaped it."

Acapulco, first week in April. Letter from John A. Sutter, Esq., U S. Consul, Acapulco, June 13, 1873: "The epizoötic made its appearance in the vicinity of the port of Acapulco during the first week of April. . . But a few horses died, although they all had it."

La Paz, exempt. Letter from David Turner, Esq., United States Consul, La Paz, June 20, 1873: "No signs of the 'epizoötic' have yet been noticed in this Territory, or, at least, we in this southern portion of the peninsula have heard of none."

Minatitlan, exempt. Letter from John A. Wolf, Esq.,

United States Consul, Minatitlan, July 2, 1873: "As far as I am aware, the epizoötic has really not appeared here."

Tabasco, exempt. Letter from Aug. J. Cassard, Esq., United States Consul. Tabasco, July 5, 1873: "In this consular district that epidemic has never arrived, and is totally unknown"

Merida, exempt. Letter from Marlin F. Hatch, Esq., United States Consul, Merida, October 16, 1873: "The epizoötic has not appeared in the State of Yucatan."

Guatemala.

Guatemala City, first part of July Letter from Henry Houben, Esq., United States Consul, Guatemala City, July 15, 1873: "The aforesaid disease made its appearance in this city a few days ago. . . The animal has no appetite, and a continual coughing follows."

San Salvador.

La Union, about August 1st. Letter from J F. Flint, Esq., United States Consul, La Union, October 4, 1873: "An epidemic disease commenced among the horses and mules in this department about the 1st of August. Symptoms, loss of appetite, fever in about ten days, continued from three to sixteen days, followed by cough; some had a discharge of yellow mucous from the nose, others not; duration variable, from two to eight weeks; great loss of flesh."

At this date (Dec. 25, 1873) no information has been received of the appearance of the disease south of San Salvador.

European Countries.

The recent appearance of the epizoötic in question in Europe has not been mentioned in the veterinary journals of London, Paris, or Brussels.

In the compilation of the preceding detailed history, and of the accompanying maps, an effort has been made to arrange the facts in such a way that may throw light on the question of the mode of conveyance of this epizoötic. The results which have been obtained take the form of three propositions, which will now be presented, together with a brief statement of the more prominent facts which are found to support and prove them. As it is probable that the laws which govern the spread of this disease are also the laws which govern the spread of epidemic influenza, the importance

of the subject justifies a formal presentation of the propositions and proofs, as follows:

Proposition No. 1.—Epizoötic influenza does not spread by virtue of any of the recognized atmospheric conditions of cold, heat, humidity, season, climate, or altitude.

The proof of this proposition amounts to a demonstration, as will be seen by a reference to the map. The disease prevailed and was propagated in the cold of a northern winter, and in the summer heat of Central America; in the dry air of Minnesota, and in the moist air of the seaboard; at an altitude of five thousand feet above the sea, at Saltillo, Mexico, and on the low levels of New Orleans, La. (ten feet above sea-level), and Galveston, Texas (five feet above sea-level).

Proposition No. 2.—Epizoötic influenza does not spread solely by virtue of unrecognized atmospheric conditions.

During the prevalence of the disease, the opinion was expressed, by many thoughtful observers, that it was spreading through the air, or by virtue of some unknown atmospheric condition. In no other way did it seem possible to explain the sudden prostration of all or nearly all of the horses in a city or limited district. Subsequent investigation has not proved that the disease is *not* communicable through the air at short distances, and over limited areas. They have proved, however, that the spread of the disease over the country is not solely, or chiefly, by virtue of unrecognised atmospheric conditions.

The irregularities in time and place, in the appearance of this disease, are so numerous and surprising that they cannot be classified or brought into harmony with any system of laws that bears any resemblance to the laws which govern the phenomena of any of the recognised atmospherical conditions. Some of the irregularities may be appreciated by examining the larger of the accompanying maps, with the assistance of the arcs and radii that have been drawn, taking Toronto, where the disease first appeared, as a centre. It will be seen that the disease appeared at places equally remote from its starting-point at widely differing dates, for instance, at Montreal, Canada, October 8th; Burlington, Vt., October 26th; Rutland, Vt., November 3d; New York, October 21st; Trenton N. J., November 2d; Columbus, O., November 16th; and Grand Haven, Mich., November 8th. It will also be seen that the disease appeared simultaneously at St. Louis Mo., and Galveston, Tex., the latter place being twice as far, in the same direction, from Toronto as the former. These

are but instances taken from a countless number of similar facts to be found all over the map.

By these considerations proposition No. 2 is logically proved, unless we are willing to believe in the existence of an unrecognised atmospheric condition whose phenomena are governed by laws which bear no relation of resemblance or analogy to the laws which govern the phenomena of the recognised atmospheric conditions.

Proposition No. 3.—Epizoötic influenza spreads by virtue of its communicability.

Experiments for the *demonstration* of this proposition have been wanting. The incidents attending the appearance of the disease at Chicago, Ill., as recorded on p. 259, approach closely to a satisfactory demonstration. If the statements in regard to the appearance of the disease at Chicago had been the result of scientific observation, they would have demonstrated our proposition.

Admitting the present impossibility of demonstration we have abundant and convincing *logical proof*, as follows:

1. It is logical proof of this proposition, that no place was exempt from the disease which was known to have been in communication, by means of horses or mules, with places in which the disease existed.

On the main-land of this continent every place which is known to have had communication, by means of horses or mules, with places where the disease existed, suffered from the disease. In regard to the West India Islands, we have letters from two correspondents (page 268) which mention the importation of American horses into Havana. Cuba was overrun by the disease.

2. It is logical proof of this proposition that the places that were exempt from the disease were so situated that the importation of horses or mules was in some of them impossible, and in others of them improbable The following places were exempt: Prince Edward Island, Vancouver's land, Key West, the island of Hayti and San Domingo, the island of Jamaica, La Paz, and that portion of Mexico containing Minatitlan, Tabasco, and Madeira.

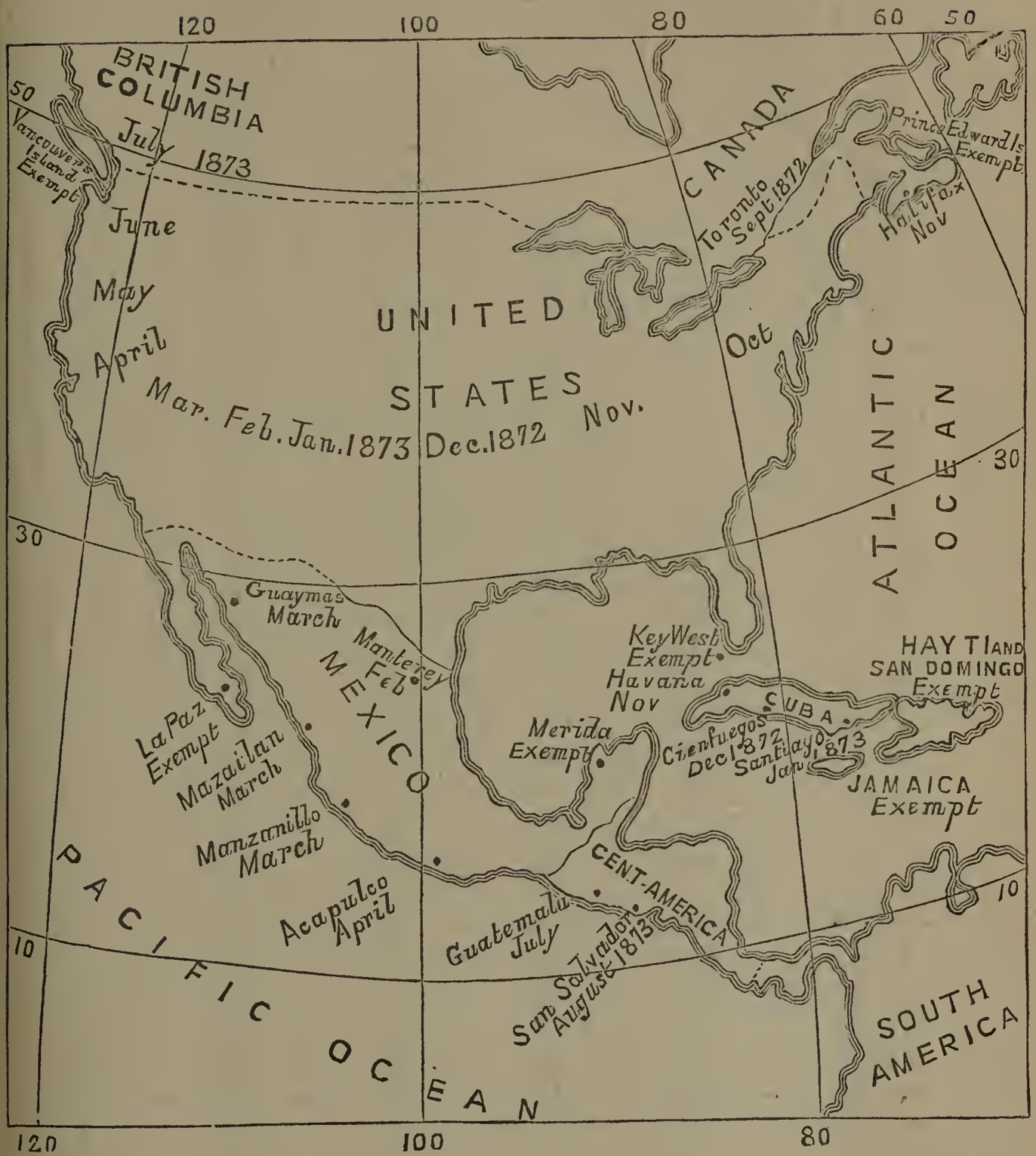
Prince Edward Island and Vancouver's Island were sequestered, the former by the severity of a Canadian winter, and the latter by a quarantine against horses and mules. The islands of Key West, Hayti, and San Domingo, and Jamaica, have a limited amount of commercial intercourse with the ports of this country or with Cuba, and the importation of horses or mules is probably a very rare occurrence.

La Paz, near the extremity of the peninsular of Lower California, is so situated that, in all probability, there is no unbroken communication by horses and mules with those portions of Mexico in which the disease prevailed. The same statement can be made concerning Minatitlan, Tabasco, and Madeira, as the region in which they are situated is separated from the States of Vera Cruz and Mexico, in which the disease prevailed, by difficult and thinly-settled lowlands.

3. It is logical proof of this proposition that the disease passed rapidly over those regions in which the towns and cities are numerous and in frequent communication with each other, and with comparative slowness over those regions in which the towns are less numerous and in less frequent communication with each other.

An examination of the map will show that the disease spread rapidly over the States east of the Mississippi and Missouri Rivers, where cities and towns are numerous, and where communication is rapid and easy; and that the rate of its progress was greatly reduced as it passed over the thinly settled States and Territories of the western half of the country where communication is slow and difficult.

There are many minor points which illustrate the fact that the rate of progress made by the disease depended on the amount and facility of commercial intercourse. Some of these points are, in brief, as follows: The early appearance of the disease at New York, Philadelphia, Baltimore, and Washington, places situated on a crowded line of travel, and its late appearance in a large region lying between these cities and the starting-point of the disease, as well as in certain important cities and towns lying near, but not on this great line of travel; the rapid progress of the disease along the line of the Specific Railway; the arrest of the disease by the Sierra Nevada Mountains, impassable by horses and mules at that season, and its invasion of California after flanking the mountains by way of the succession of the mining-districts between Carson City and Inyo; and the division of the current of the disease by the Sierra Nevada Mountains and the unoccupied territory in Northern California and Oregon, one division moving more rapidly than the other by reason of passing over a more thickly-settled region. The early appearance of the disease at New Orleans, La., and Galveston, Tex., has caused the surmise that infected animals were landed at those ports by some of the numerous coasting steamers from New York and Philadelphia.



Mortality in New York.

The mortality caused by this epizoötic on the Island of New York is estimated from the weekly returns made by sanitary police-officers on duty in the premises of the New York Rendering Company. As there are no ordinary means of disposing of refuse carcasses except by the agency of this company, these returns may be received as sufficiently accurate bills of mortality among horses.

The following table, taken from the returns above mentioned, presents the total mortality among horses in New

York, in the years 1871 and 1872, and the half-year ending June 30, 1873:

Mortality of Horses in New York by weeks.

Week ending			Week ending			Week ending		
Jan. 4,	1871,	71	„ 8,	„	92	„ 9,	„	118
„ 11,	„	75	„ 15,	„	91	„ 16,	„	115
„ 18,	„	85	„ 22,	„	92	„ 23,	„	108
„ 25,	„	62	„ 29,	„	80	„ 30,	„	118
Feb. 1,	„	55	Dec. 6,	„	83	Oct. 7,	„	126
„ 8,	„	65	„ 13,	„	91	„ 14,	„	111
„ 15,	„	86	„ 20,	„	96	„ 21,	„	89
„ 22,	„	82	„ 27,	„	95	„ 28,	„	124
Mar. 1,	„	60	Jan. 1,	1872,	86	Nov. 4,	„	364
„ 8,	„	66	„ 8,	„	78	„ 11,	„	586
„ 15,	„	81	„ 15,	„	118	„ 18,	„	442
„ 22,	„	103	„ 22,	„	78	„ 25,	„	246
„ 29,	„	73	„ 29,	„	55	Dec. 2,	„	164
Apr. 5,	„	92	Feb. 5,	„	55	„ 9,	„	141
„ 12,	„	91	„ 12,	„	54	„ 16,	„	131
„ 19,	„	87	„ 19,	„	80	„ 23,	„	104
„ 26,	„	79	„ 26,	„	83	„ 30,	„	125
May 3,	„	75	Mar. 4,	„	67	Jan. 6,	1873,	138
„ 10,	„	66	„ 11,	„	96	„ 13,	„	124
„ 17,	„	66	„ 18,	„	79	„ 20,	„	133
„ 24,	„	69	„ 25,	„	71	„ 27,	„	105
„ 31,	„	69	Apr. 1,	„	87	Feb. 3,	„	134
June 7,	„	79	„ 8,	„	98	„ 10,	„	175
„ 14,	„	115	„ 15,	„	94	„ 17,	„	181
„ 21,	„	140	„ 22,	„	84	„ 24,	„	132
„ 28,	„	125	„ 29,	„	98	Mar. 3,	„	146
July 5,	„	146	May 6,	„	85	„ 10,	„	165
„ 12,	„	164	„ 13,	„	86	„ 17,	„	164
„ 19,	„	165	„ 20,	„	95	„ 24,	„	124
„ 26,	„	111	„ 27,	„	80	„ 31,	„	145
Aug. 2,	„	102	June 3,	„	88	Apr. 7,	„	138
„ 9,	„	108	„ 10,	„	67	„ 14,	„	106
„ 16,	„	109	„ 17,	„	107	„ 21,	„	123
„ 23,	„	128	„ 24,	„	103	„ 28,	„	84
„ 30,	„	146	July 1,	„	89	May 5,	„	89
Sept. 6,	„	125	„ 8,	„	220	„ 12,	„	86
„ 13,	„	141	„ 15,	„	157	„ 19,	„	73
„ 20,	„	143	„ 22,	„	166	„ 26,	„	87
„ 27,	„	105	„ 29,	„	101	June 2,	„	95
Oct. 4,	„	114	Aug. 5,	„	106	„ 9,	„	98
„ 11,	„	116	„ 12,	„	114	„ 16,	„	87
„ 18,	„	90	„ 19,	„	136	„ 23,	„	80
„ 25,	„	133	„ 26,	„	157	„ 30,	„	67
Nov. 1,	„	107	Sept. 2,	„	146			

In order to estimate the mortality caused by the epizoötic, in the absence of certified causes of death, it is necessary to ascertain the normal mortality. The normal mortality will

Map of the United States
Showing
the course of the Epizootic
among HORSES and MULES in 1872 3.

EXPLANATION:

The dates affixed to the Towns and Cities indicates the first appearance of the disease

This line separates ——— the Dates by months

The Railroads ——— are not given east of the Mississippi between parallels 35 and 43 as they are too numerous to show well on this Map.

To accompany a Report prepared for the Sanitary Committee of the HEALTH DEPARTMENT, NEW YORK.

Statute Miles

0 20 40 60 80

Mazatalan Mex. Middle of March
Manzanillo " March 19th
Acapulco " 1st week in April
Monatitlan " Exempt
Tabasco "
Merido "
Guatemala City 1st part of July
La Union, San Salvador; Almost daily

Havana Cuba Middle of November
Matanzas "
Cienfuegos " Latter part of December 1871.
Santiago de Cuba Middle of January 1872.
San Domingo Exempt
Hayti "
Jamaica "

JUNE
MAY
APRIL
MARCH
APRIL
FEBRUARY
JANUARY
DECEMBER
OCTOBER
NOVEMBER

Halifax, Nova Scotia — No
Charlottetown P.E. Island Express

Victoria
Portland 3 w May
Dallas 4 w May
Walla Walla Last week April
Eugene City 3 w May
Baker City Apl 3
Jacksonville 4 w April
Bois City 3d w March
Lava Beds 4 w April
Shasta 2 w April
Weaverville
Marysville 2 w Ap
Red Bluff 2 w Ap
Virginia City 16 w March
Sacramento 2 w Ap
Carson City
Vallejo 2 w Ap
San Francisco 2 w Apl
Oakland 2 w Ap
Alameda 2 w Ap
Oakland Apl 10
Martinez 2 w Apl
Stockton 2 w Apl 16
Visalia 3 w March
Bakersfield 4th week March
Santa Barbara 1st March
San Diego 1st w April
Yuma 4th week in March
Tucson 2nd week March
Prescott 1st w Mar
Albuquerque 1st w Jan
Santa Fe
Helena 1st w March
Winnemucca Middle of Feb
Gerlach 1st w Jan
Salt Lake City 1st w Jan
Cheyenne 2 w Jan
Central City 1st w Dec
Denver 1st w Dec
Pueblo 1st w Jan
Elizabeth City 2d w Jan
Cimarron 2d w Jan
Fort Smith 3d w Nov
Camden Dec 7
Shreveport 2d w Dec
Vicksburg 1st w Nov
Natchez 4th w Oct
Mobile 1st w Nov
New Orleans Nov 25
Galveston 4th week in Nov
Brownsville 3d week in Nov
Monterey 1st w Feb
San Antonio Jan 3
Guaymas March
Fort Benton
Bismarck
Fort Buford
Fort Pierre
Fort Sully
Fort Randall
Yankton 1st w Dec
Vermillion 4 w Dec
Dubuque 3 w Nov
Iowa City 2d w Nov
Davenport Nov 14
Galena Nov 25
Muscatine 3d w Nov
Burlington 1st w in Dec
Galesburg 1st w Nov
Peoria
Omaha 1st w
Lincoln 1st w Dec
Nebraska City
St Joseph
Leavenworth
Topeka 1st w Dec
Lawrence 1st w Dec
Kansas City 1st w Dec
Hannibal 2 w Nov
St Louis
Cairo 4th w Dec
Paducah 4 w Nov
Springfield last w Nov
Bloomington 1st w Nov
Decatur 1st w Nov
Terre Haute 1st w Nov
Indianapolis Nov 11
Madison 1st w Nov
Louisville 1st w Nov
Evansville Nov 18
Nashville 1st w Nov
Memphis 1st w Dec
Little Rock Last w Nov
Helena Last w Nov
Green Bay Nov 1
Fond du Lac 3d w Nov
La Crosse 2d w Nov
Madison Nov 1
Milwaukee Nov 1
Manitowoc Nov 1
Sheboygan Nov 1
Grand Haven Nov 1
Port Huron
Detroit Oct 16
Monroe Oct 23
Toledo Oct 23
Cleveland 1st w Oct
Sandusky Oct 16
Fort Wayne
Lafayette 1st w Nov
Springfield Nov 1
Columbus Nov 6
Cincinnati Nov 5
Dayton 1st w Nov
Zanesville Nov 1
Steubenville Nov
Wheeling Nov 10
Parkersburg Nov 1
Pittsburg 1st w Oct
Erie Oct 13
Cleveland Oct 13
Ashtabula Oct 13
Painesville Oct 13
Conneaut Oct 13
Barrie 1st w Oct
Owen Sound 2 w Oct
Collingwood 1st w Oct
Toronto 1st w Oct
Port Hope 1st w Oct
Belleville Oct 13
Kingston 1st w Oct
Brockville 1st w Oct
Prescott 1st w Oct
Ottawa 1st w Oct
Montreal 1st w Oct
Quebec Oct
Belvidere 1st w Oct
Peterboro 1st w Oct
Port Hope 1st w Oct
Toronto 1st w Oct
Hamilton 1st w Oct
Niagara 2nd w Oct
Rochester 2nd w Oct
Syracuse 2nd w Oct
Utica 1st w Oct
Albany Oct
Troy Oct
Schenectady Oct
Saratoga Springs 1st w Oct
Rutland 1st w Oct
Burlington 1st w Oct
Albans Oct
Concord Last w Oct
Portsmouth Oct 31
Bath Oct 31
Portland 1st w Oct
Bangor 3 w Oct
St John 1st w Oct
Boston Oct 16
Worcester Oct 23
Providence Oct 23
Fall River 1st w Oct
New Bedford 1st w Oct
Newport 1st w Oct
New York Oct 21
Newark 1st w Oct
Jersey City 1st w Oct
Brooklyn 1st w Oct
Port Jervis Oct 28
Binghamton 1st w Oct
Auburn 1st w Oct
Waterbury Oct 28
Elmira 1st w Oct
Williamsport 1st w Oct
Scranton 1st w Oct
Wilkesbarre 1st w Oct
Pottsville 1st w Oct
Harrisburg 1st w Oct
Lancaster 1st w Oct
York Last w Oct
Baltimore 1st w Oct
Philadelphia 1st w Oct
Trenton 1st w Oct
Washington 1st w Oct
Richmond 1st w Oct
Lynchburg 1st w Oct
Norfolk 1st w Oct
Raleigh 1st w Nov
New Berne 1st w Nov
Wilmington Nov 7
Columbia 1st w Nov
Charleston 1st w Nov
Augusta 1st w Nov
Atlanta 1st w Nov
Macon 1st w Nov
Columbus 1st w Nov
Montgomery 1st w Nov
Selma 1st w Nov
Savannah 2 w Nov
Jacksonville 1st w Nov
Tallahassee 1st w Dec
Lake City 1st w Dec
Middle Florida Winter of 72 3
Key West 2d w Jan
Knoxville 4 w Nov
Chattanooga 1st w Nov
Charlotte 1st w Nov
Wilmington Nov 7
Lake Ontario
Lake Erie
Lake Michigan
Lake Superior
Lake Champlain
Lake Huron
Lake Michigan
Lake Winnipeg
Unorganized Territory
Minnesota
Wisconsin
Michigan
Iowa
Nebraska
Kansas
Missouri
Illinois
Indiana
Ohio
Kentucky
Tennessee
Mississippi
Alabama
Georgia
South Carolina
North Carolina
Virginia
West Virginia
Pennsylvania
New York
Maine
Vermont
New Hampshire
Massachusetts
Rhode Island
Connecticut
New Jersey
Delaware
Maryland
Montana
Idaho
Wyoming
Oregon
Nevada
Utah
Colorado
Arizona
New Mexico
Indian Territory
Arkansas
Louisiana
Texas
Canada
Pacific Ocean
Atlantic Ocean
Gulf of Mexico

be represented by the average weekly mortality for the year 1871, and the first half of the year 1872, leaving out of account the four hot months, June, July, August and September, of each year. During these months the mortality among horses, as well as among men, is augmented by the heat of summer. The normal weekly average mortality among horses in New York is thus found to be eighty-nine (89).

Although, as seen in the foregoing table, the mortality, perhaps from remote and unrecognised sequelæ of the epizoötic, remained high for several months, the epizoötic and its immediate sequelæ cannot be said to have influenced the death-rate for more than six weeks. For this period, the mortality caused by the epizoötic has been estimated as seen in the following table:

	Mortality from all causes.	Normal Mortality.	Mortality caused by the Epizoötic.
Week ending October 28	124	89	35
„ „ November 4	369	89	280
„ „ „ 11	586	89	497
„ „ „ 18	442	89	353
„ „ „ 25	246	89	157
„ „ December 2	164	89	75
Totals.....	1931	534	1397

In the height of the epizoötic, fifteen (15) horses were buried north of One Hundredth Street, on a general permit issued by the Health Department. This number is therefore included in the following statement:

The number of horses destroyed by the epizoötic in New York, during the six weeks of its prevalence, was, 1412. The total mortality for that period was 1946. As the disease was almost universal in its attack, it is probable that the whole number (1946) were affected with the influenza at the time of their death. The epizoötic may, therefore, be said to have been the first cause of death in 1412 cases, and the second cause in 534.

According to a census taken by the Bureau of Sanitary Inspection of the Health Department, in February and March, 1870, there were at that time 38,272 horses stabled in New York. A calculation based on these figures shows that 3·7 per cent. of the horses in New York were destroyed by the epizoötic.

WISLIZENUS ON TRICHINOSIS.

By T. S. Cobbold, M.D.

An original communication by Dr. A. Wislizenus, in the *St. Louis Medical and Surgical Journal* for July, 1873, gives an account of a small outbreak of this disease, characterised by several unusual features. He says, "The family were Germans, who generally enjoyed good health, with the exception of occasional fevers. On January 25 I was called to see three sick children, of the respective ages of eight, ten, and twelve years. They had been ailing for about five days with symptoms of gastric catarrh, *i. e.* nausea, want of appetite, coated tongue, light pain in the bowels, diarrhœa, thirst, hot and dry skin, quick and feeble pulse, and general feeling of prostration. Upon inquiry I ascertained that the family had bought a fine-looking dressed hog; that they had cut it up and salted it, and that a small portion of it had been roasted and eaten by them a week previously. They stated also that part of the meat had not been sufficiently done. Three other children and three grown men, who had eaten freely of it, remained perfectly well. I took some pieces of the pork for examination. I gave one to Dr. Engelmann, who found some unencysted trichinæ in it. In the other pieces, I found them also, but not in great numbers, none encysted, not all even coiled. The trichinosis of that hog was therefore constated (*sic*) as a recent infection, which gave a better prognosis for the sick children. Two weeks after the pork dinner, I got a fourth patient. The mother had symptoms similar to those of her children. I considered her disease also as trichinosis, but she assured me that she had not touched or tasted any of that pork. Her prostration became quite alarming, and continued for a long time. It was highly interesting to me to ascertain, several weeks after she was laid up, that she had assisted in the cutting up of the hog, and that she had taken from a saw used on that occasion some small pieces of raw lean meat, tasted them herself, and given small bits to the same three children who were first taken sick. She could not be induced to believe that a few mere fibres of meat could produce so terrible a disease. I entertained no doubt that the riddle of the true origin of the disease had been solved by this trifling circumstance. That the smallest piece of raw trichinous meat is far more dangerous than affected meat given in any other form, is self-evident. Three weeks afterwards the family hospital was increased by a fifth patient—a young man in

their employ. He had several times partaken of the roasted pork, but remained well for nearly three weeks, when he was suddenly attacked. I considered his case also a trichinous affection in a milder form. In about a week he got up again; his œdema had disappeared, his appetite returned, and in a week more he seemed to be quite restored. My first patients, the three children, continued their slow course towards recovery. The youngest child, however, who from the first was more severely attacked, experienced a relapse, and died from exhaustion on April 6, eleven weeks after the commencement of her disease. When I arrived the funeral was already so arranged that I obtained only a chance, with the permission of the father, to cut a small piece out of the gastrocnemius muscle for microscopic examination. Never before had I seen a muscle so saturated with trichinæ. In a small piece of the size of a pin's head, I counted about a hundred. Some seemed to be entirely free, others showed the commencement of encysting, none were really encysted. Dr. Engelmann found some alive, and on puutting them in a few drops of water, at blood-heat, they exhibited very active motions."

THE CONSTITUTION OF BLEACHING POWDER.*

By C. Schorlemmer.

The author was much surprised by reading lately a paper, by Goepner, "On the nature of Chloride of Lime," in which he revives Berthollet's view, that the bleaching compound contained in it is simply a combination of lime and chlorine, and decomposed by acids into its constitutents. He says that, although we find in all handbooks the statement that a solution of hypochlorous acid is obtained when a solution of bleaching powder is distilled with a dilute acid, as if the experiment had been made hundreds of times, this is a mistake; and the reason why the error has maintained itself so long is, that hitherto no reaction was known by which free chlorine and hypochlorous acid could be readily distinguished. Such a reaction has, however, now been discovered by Wolters, who has found that when chlorine-water is shaken with mercury, only mercurous chloride is formed; while with aqueous hypochlorous acid it yields a brown, crystalline oxychloride, which is readily soluble in

* Abstract of a paper in 'Deut. Chem. Ges. Ber.,' vi, 1509, from the *Journal of the Chemical Society* for April.

hydrochloric acid. In employing this method for detecting hypochlorous acid in the liquid obtained by distilling bleaching powder with a small quantity of hydrochloric or sulphuric acid, Goepner could not find a trace of hypochlorous acid.

To this the author remarks that Gay-Lussac, in his classical research "On the Compounds of Chlorine with Bases," recommends, as a ready means for preparing a dilute solution of hypochlorous acid, to distil a solution of bleaching powder with dilute nitric acid. This experiment has since been repeated hundreds of times. Roscoe shows it every year in his lectures, and the laboratory students perform it in the course of their practical work. A perfectly colourless distillate is thus obtained, which is a much more powerful bleaching agent than freshly prepared chlorine-water. This is quite sufficient to show that the distillate contains hypochlorous acid. But why did Goepner fail in detecting it? Is it the fault of the analytical method? To decide this, hypochlorous acid was prepared by distilling a solution ofbleaching powder with dilute nitric acid or sulphuric acid. On shaking the distillate with mercury, the brown oxychloride was formed in each case. Another argument against the existence of a hypochlorite in bleaching powder Goepner finds in the fact that the chlorine used in the manufacture always contains hydrochloric acid, and thus more calcium chloride is formed than would correspond with the formula $CaO\ Cl_2$. When bleaching powder is exhausted successively with small quantities of water, this excess of calcium chloride is found in the first solutions, while the following contain calcium and chlorine in the proportion corresponding with the above formula. This, however, only proves that bleaching powder is not a mixture of calcium chloride and hypochloride, but that it contains the compound $Ca\begin{cases} Cl \\ OCl \end{cases}$ or has the constitution which Odling has assigned to it. Williamson has shown that a solution of hypochlorous acid is also readily obtained by passing chlorine into a mixture of water and finely divided calcium carbonate, and distilling as soon as the carbonate is dissolved. In this reaction the above compound is probably also first formed and then decomposed in the following way:—

$$CaCl(OCl) + Cl_2 = CaCl_2 + Cl_2O.$$

Analysis of Continental Journals.

By G. Fleming, M.R.C.V.S., Royal Engineers.

OSTEOCLASTY OF BOVINE ANIMALS.

The designation of "osteoclasty" has been given by Zundel to a disease of the bones of certain of the domesticated animals, which has long been observed on the continent of Europe, where it is enzöotic in some regions, and which in its general features resembles osteopsathyrosis, fragilitas ossium, or that peculiar constitutional osseous affection known as "cachexia ossifraga."

It is enzöotic in the Duchy of Baden and elsewhere, in districts with a sandy subsoil, more rarely on those which are granitic, and on soils poor in mineral elements; it is particularly observed in dry years, when the herbage and plants in general are deficient in organic constituents. It chiefly affects animals which require a large proportion of phosphates in their food, as young creatures, which need these for the formation of their bones, and animals with young in order that they may furnish them to the fœtus; as well as milch-cows, whose milk contains, according to Lehmann, about twenty-two grammes of phosphoric acid to every ten litres of that fluid (twelve and a half drachms to about two and a quarter gallons).

Professor Nessler, director of the Agronomic Station at Carlsruhe, has recently been studying the malady chiefly from a chemical point of view, and he incidentally notices some features in its symptomatology and etiology. He mentions that the disease is rarely seen in other animals than those situated as above, and he even states that he knows of instances in which cattle, other than those specified, instead of being influenced by the etiologic conditions, appeared to acquire flesh and fat rapidly.

The malady is characterised by general weakness of the limbs, extraordinary fragility of the bones, and frequently by a peculiarly depraved appetite, a "pica" *sui generis*, which is generally the first symptom of the disorder, the animal constantly licking walls and mangers, and with such earnestness that thick boards are sometimes worn through in a few days. There is then great salivation, the manger being saturated, as well as the anterior part of the animal's body, and the mouth is always foamy; in its anxiety to lick, the creature

forgets to eat and to ruminate, and falls into a hectic condition.

The most efficacious remedy was found to be emigration to another locality where the etiological conditions alluded to did not prevail; in a short period, if the disease was not too advanced, the animals completely recovered without any treatment.

The diseased bones, which were chemically analysed by Nessler, were furnished by H. Utz, veterinary surgeon at Villingen, Baden; they belonged to the pelvis, dorsal vertebræ, radius, tibia, and the articular eminences. With each analysis there was also made a comparative examination of the same bone obtained from a healthy cow about four years old. The long bones were reduced by means of a rasp, while the articular ends and short bones were sawn into thin fragments. All the bones were previously dried.

The ash obtained was sprinkled with carbonate of ammonia and heated. The phosphoric acid was separated by the aid of a solution of uranium, and weighed as magnesian pyrophosphate. All that portion soluble in ether was reckoned as fat.

The following are the results obtained by these analyses:

Pelvic Bones. In 100 *parts.*

	Healthy.	*Diseased.*
Ash	45·49	36·75
Phosphoric acid	15·93	12·81
Carbonate of lime	10·72	8·89
Fat	25·52	36·65
Nitrogen	3·67	4·00

Dorsal Vertebræ.

	Healthy.	*Diseased.*
Ash	45·50	28·09
Phosphoric acid	18·81	10·59
Carbonate of lime	4·97	4·97
Fat	22·65	36·00
Nitrogen	3·41	4·76

Radius.

	Healthy.	*Diseased.*
Ash	64·27	65·96
Phosphoric acid	27·68	29·22
Carbonate of lime	3·85	2·47
Fat	1·63	3·96
Nitrogen	4·09	3·84

Tibia.

	Healthy.	*Diseased.*
Ash	61·02	66·95
Phosphoric acid	25·92	25·74
Carbonate of lime	4·47	10·76
Fat	1·90	1·57
Nitrogen	4·62	4·72

Articular Eminence of Tibia.

	Healthy.	*Diseased.*
Ash	34·82	24·41
Phosphoric acid	14·08	9·36
Carbonate of lime	4·09	4·28
Fat	26·70	58·61

It will be perceived from these analyses that there is a marked difference between the healthy and diseased bones, when the short bones, those of the pelvis, the vertebræ, and also the articular eminences of the long bones are examined. In the latter, only the body of which was analysed, there is not much difference; with the spongy bones, however, there is a notable diminution in the proportion of inorganic matter, and particularly the phosphoric acid, and a corresponding increase in the animal matter. This result agrees with that previously obtained by Gorup-Bessanez, Kreuscher, and other chemists.

It has been known for a long time that the characteristic pathological alterations of the disease were more advanced in the short and flat than in the long bones, and that in the latter they were most conspicuous at their extremities.

A curious result obtained is the predominance of fat in the diseased bones, and especially in those which are porous. This feature does not concord with what has been reported by other chemists, but it is not novel. Fuchs, Kreuscher, and others, have remarked a diminution in the fat of diseased bones, and in the great majority of instances such bones, even when kept in a warm place, do not feel greasy; but there are cases described by Kopp, of Strasburg, and Lucanus and Hoffmann, of Prague, in which there appeared to be fatty degeneration of the bone, coincident with its reduction and the absorption of the osteoplasts of the spongy portion. In this condition the pathological change resembles that of "mollities ossium."—*Zundel. Rec. de Méd. Vét.*, 1874; *Der Thierarzt*, 1873.

INFLUENCE OF FORAGE ON THE COMPOSITION OF THE BONES.

Related to the preceding notice are the researches made by Weiske, at the Agronomic Station at Proskau, which tend to establish the influence of forage deficient in lime and phosphoric acid on the composition of the bones of animals. He has proved that adult goats fed with forage poor in these mineral constituents, although receiving it in large quantity, constantly diminish in weight and lose their strength, fall into a general cachexia, and die. The composition of the bones does not, however, appear to be modified. Experiments of a similar kind were carried out upon three lambs about two months old. One received ordinary forage, another forage deficient in lime, and the third forage poor in phosphoric acid. While the first animal increased each week about $2\frac{1}{4}$ lbs., the others lost about the same weight in that period, and finally became so weak as to be scarcely able to stand. Nevertheless, after they were killed, nothing special was noticed in their skeleton, and there was no trace of the so-called "osteoclasty." It is to be observed, however, that the latter affection is peculiar to cattle, and is never witnessed in the smaller ruminants, even when these are placed in the same conditions as the latter.—*Ibid.*

BENZINE AS AN ANÆSTHETIC.

Professor Harms, of the Dresden Veterinary School, has been making some interesting researches on the anæsthetic properties of benzine. The horses to which it was administered were much excited at first, and struggled a good deal; but in about three minutes this ceased, in ten minutes sensibility was much diminished, and it was completely in abeyance in from fifteen to twenty minutes. The general temperature was increased during the stage of excitement, but as soon as anæsthesia became complete it gradually descended below the normal standard to a trifling degree; the pulse was also weaker, and numbered from fifty to sixty a minute; the beats of the heart were accompanied by a blowing and sawing sound; and the respiration, a little slower than usual, was deep and rather laboured. Anæsthesia continued for an hour, and was readily reproduced, so that it could be maintained for three and four hours. In weakly animals anæsthesia was all the more easily induced, and with less excitement than in those which were vigorous. An ox was rendered quite insensible in ten minutes.—*Ibid.*

ROYAL COLLEGE OF VETERINARY SURGEONS.

SPECIAL MEETING OF COUNCIL, HELD JUNE 2ND, 1874.

PRESENT:—Professors Simonds, Pritchard, and Assistant-Professor Axe; Col. Sir F. Fitzwygram, Bart.; Messrs. Balls, Burrell, Cox, Dray, Field, Fleming, Gowing, Greaves, Harpley, Hunt, Moore, Pritchard, Woodger, and the Secretary.

A letter was read from the late President, Professor Brown, regretting his inability to attend the Council meeting in consequence of ill health.

It was moved by *Mr. Greaves*, and seconded by *Mr. Dray*, "That Mr. J. Harpley, Esq., take the Chair."—Carried.

The election of a President was then proceeded with.

It was moved by *Mr. Hunt*, "That Professor Williams, Principal of the Edinburgh New Veterinary College, be elected President for the ensuing year."

Professor Simonds moved, "That Mr. E. C. Dray, M.R.C.V.S., be elected President."

On the ballot being taken, there were found to be for—

Mr. E. C. Dray, 11; and for Professor Williams, 6.

Mr. E. C. Dray was accordingly declared President for the ensuing year.

Mr. Dray having taken the Chair, returned thanks for the honour of his election.

The election of six Vice-Presidents was next proceeded with.

The following gentlemen were proposed:

Professor M'Call, by Mr. Fleming.
Mr. S. H. Withers, by Professor Simonds.
Mr. M. E. Naylor, by Mr. Hunt.
John J. Cheesman, by Mr. Dray.
T. W. Mayer, by Mr. Greaves.
H. J. Cartwright, by Mr. Harpley.
Mr. William Hunting, by Mr. Burrell.
T. W. Talbot, by Professor Pritchard.
Clement Lowe, by Professor Pritchard.
Francis Blakeway, by Mr. Pritchard.

On the ballot being taken it was found that there were for

Mr. S. H. Withers	17
Professor M'Call	12
Mr. M. E. Naylor	11
Mr. T. W. Mayer	10
Mr. John Josh. Cheesman	10
Mr. H. J. Cartwright	9
Mr. Wm. Hunting	7
Mr. Clemt. Lowe	4
Mr. T. W. Talbot	4
Mr. Francis Blakeway	3

The election was declared to have fallen upon Mr. S. H. Withers, Professor M'Call, and Messrs. Naylor, Mayer, Cheesman, and Cartwright.

The election of a Treasurer was then proceeded with.

Mr. Harpley proposed, "That Mr. S. H. Withers be re-elected Treasurer."

On the ballot being taken, Mr. Withers was declared to be unanimously re-elected.

The election of a Secretary was then proceeded with.

Mr. Harpley proposed, "That Mr. W. H. Coates be re-elected Secretary."

On the ballot being taken, Mr. Coates was declared to be unanimously re-elected.

The President then proposed, "That a vote of thanks be given to the late President (Professor Brown), for the very efficient manner in which he had conducted the duties of his office during the past year, and that the best wishes of the Council be conveyed to him for his speedy restoration to health."—Carried unanimously.

CENTRAL VETERINARY MEDICAL SOCIETY.

The ordinary meeting of the above Society was held Thursday, June 4th, at 10, Red Lion Square, W.C., at 7 p.m., the President, T. J. Mavor, Esq., in the chair. Mr. James Moore, jun., related a case of fracture of the femur occurring to a cart-horse while engaged in draught work. When just about to start with a load of corn the animal stumbled and fell. The horse, being unable to stand in the shafts, was led to a box, where he died the next morning. On a *post-mortem examination* being made, the right femur was found to have sustained a comminuted fracture. The bone, which was exhibited, showed no sign of

previous fracture, and appeared to be very deficient in the animal constituents, which circumstance in the opinion of those present accounted for the fracture.

The President then asked the attention of the Fellows to a case that had recently come under his notice. A brown gelding was brought to him from Lincolnshire six weeks since, showing the following symptoms:—Pulse 60, temperature 103°; tongue hot and furred; breath offensive; conjunctival membranes slightly affected; a yellow nasal discharge. The respiration was laboured, and there were twitchings of the voluntary muscles, particularly of the extremities, the hind limbs being constantly snatched up, and great uneasiness shown by the animal frequently lying down and getting up. These symptoms continued till the fifth day, when death ensued. It was considered that the horse was suffering from disease of the spleen. Atropine was injected subcutaneously for the deranged sympathetic system, aconite for the congested spleen, and tinct. nux vomicæ for the spinal membranes. In the *post-mortem examination* the spleen was found to be perfectly black with blood; mucus had accumulated in the bronchial tubes; the spinal membranes were slightly injected, and there was slight sero-sanguineous effusion. Judging from these appearances, the President was inclined to believe that the disease commenced in the membranes of the spinal cord, and the congested spleen was the result of derangement of the sympathetic zone from reflected irritation. In answer to inquiries he furthermore informed the Fellows that the horse was in good condition, not over fat; that the urine was not observed to be scanty or give evidence of disease; also, that the liver was healthy.

The chair was then taken by Mr. T. Burrell, jun., V.P., and the President proceeded to make a few observations on a drug now being used in the medical profession—the "Datura Tatula"—in the hope that those present might be led to experiment with it and report thereon. The only preparation he knew of was a tincture made in the same proportions as Tr. Strammonii, B.P., and the cigarette prepared by chemists. Of its toxic qualities he was ignorant, never having given poisonous doses. Its physiological effect in the horse in ʒiij doses is to dilate the pupils (though not to the same extent as belladonna), to dry the tongue, cause the secretion of a greenish mucus from the nostrils, and a dry cough; to raise the temperature, give origin to muscular twitchings of the face, and a soft compressible pulse, thus indicating that the action of the drug is on the "sympathetic" tract, and consequently the mucous membranes and unstriped muscular fibre generally; but it appears to act specifically on the pneumograstic nerves. He was unaware of its having

been used to fumigate animals with, but considered its use would be of great benefit. In man, when smoked, it relieves the pain of heartburn, is very efficacious also in relieving spasmodic asthma. The tincture given to the horse in ʒiss doses speedily relieves asthma, or what is called "broken wind." In smaller doses he believed it would almost supersede belladonna in affections of the larynx, pharynx, bronchial mucous membranes, air-cells of the lungs, and affections of the œsophagus and stomach, and prove a valuable addition to the pharmacopœia, and especially serviceable for the dog and pig.

In the discussion of the subject the mode of preparation and the dose for a man were touched upon, the quantity stated being from ♏x—xxx. Mr. Moore stated that if the agent be smoked long it produced giddiness and faintness, which in his own case he experienced at first, then it passed off. He advocated ♏x several times daily instead of ʒiss at once.

The subject will be renewed at the next meeting in July, and the meeting concluded with votes of thanks to the Chairman and President.

Present, 11 Fellows. JAMES ROWE, Jun., *Hon. Sec.*

THE MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE twenty-seventh meeting of this Association was held at the Bell Hotel, Leicester, on Tuesday, May 19th, Mr. H. Pyatt, of Nottingham, Vice-President, in the chair.

There were also present Messrs. Bailey, sen., Bailey, jun., Leicester; Proctor, Coventry; Perrens, Worcester; Markham, Rugeley; Carless, Stafford; Wiggins, Market Harboro' Hill, Wolverhampton; Faulkner, Manchester, &c. &c. Letters of apology for non-attendance were received from several members, among them one from the President, Mr. F. Blakeway, of Stourbridge, stating that a severe fall prevented him from attending. The minutes of last meeting were read and confirmed, the accounts audited and found correct.

The officers for the coming year were to have been elected at this meeting, but on the motion of Mr. Carless, seconded by Mr. Perrens, it was deferred until the November meeting.

Mr. Harry Olver, of Tamworth, was unanimously elected a member of the association.

Mr. J. W. Hill, of Wolverhampton, read the following paper on

THE USE OF THE ACTUAL CAUTERY.

Mr. President and Gentlemen,—The subject which I have the honour to bring under your notice to-day is one so well known to you all that probably to many it will afford but little interest, and you may be inclined to ask what is there new to be stated about an operation which has been in use for generations past and still continues to be so? And yet for that very reason it is, perhaps, that little thought enters our minds on this in comparison with more modern subjects. To me there appears room for discussion on the words heading my paper, and it is to excite that discussion and elicit fresh ideas in connection with this branch of our profession that I come before you to-day as an essayist.

As I have previously hinted, the use of the actual cautery is of ancient date, having been handed down from time immemorial; it is still in veterinary practice indispensable, and I will, in the first place, briefly mention the chief cases in which it is most valuable, viz.—

In the bites of rabid animals.

In the removal of fungoid growths.

In the operation of castration.

And last, though not least, in that mode of applying it termed "firing."

In the two first-named cases the cautery effectually destroys what the knife might leave behind; its use is followed by a slough, and subsequently as a rule by healthy granulations, which, if too luxuriant, only require a few applications of nitrate of silver.

In castration the actual cautery forms a secure seal on the ends of the severed vessels, and so prevents any further flow of blood.

Firing results in the formation of a permanent bandage, and thus affords support to the part operated on. This point I shall presently dwell upon at more length, as it forms the most important portion of this paper. Before doing so I cannot refrain from expressing my strong aversion to that most inhuman practice of applying the hot iron to the horse's mouth with the intention of burning out the so-called "lampas," a practice as cruel as it is needless, and one which I feel sure you will agree with me in saying cannot be too strongly censured by all members of our profession. Only a short time since, during a visit to a patient, my attention was directed by a waggoner to a young horse under his charge that he had so operated on to his great

satisfaction. When I argued with him that milder measures would have answered the purpose far better and that he had inflicted useless pain, he replied, "There's no feeling there." After explaining to him the cause of the disease and the simple treatment required, viz. the use of the lancet, soft food for a few days, and perhaps a mild dose of physic, he appeared convinced, and said, as his other horse had got them, he would have it treated as I advised. I can hardly conceive how any educated man, the owner of a horse, if he has had one atom of the principle of humanity instilled into him, can permit such horrible torture to be inflicted, for in the majority of cases *it is the master*, and *not the servant*, that is to blame. But I will not occupy your time in dwelling longer on this subject, as my opinion appeared fully in the late controversy on it in our valuable journal the *Veterinarian*. Though the use of actual cautery is in some instances carried to extremes, as in the one just cited, yet when carefully and scientifically applied it is one of those agents the veterinary practitioner will be at a loss to find a substitute for.

And now as to that mode and the most frequent one of applying it, termed "firing." Members of our profession often remark that the day is not far distant when the firing iron will be laid aside. That day will certainly not be in our time. Though a rude instrument in the hands of unscientific and unpractical men, yet when adopted by those who are well versed in its effects, and who know how and when to apply it, it is, I venture to say, an invaluable one. No better words could I use to express its power to work good or evil than those of Mr. Percivall. He says—

"We have no restorer equivalent to the hot iron—nothing of equal power to do good or to do harm. With it, with caution, humantty, and judgment, the veterinary surgeon may, without fear of incurring the reproach of the philanthropist or lover of his horse, work a great amount of good; without such judgment and caution he will be deservedly set down as one who, through ignorance or inconsideration, has put his unfortunate patient to cruel and wanton and uncalled-for torture."

By firing we understand the drawing of lines in some form or design, with a heated iron made for the purpose, on the surface of some part of the horse's body, generally the limbs. Each one has his method of operating. Some prefer to draw the lines in some fancied form; others prefer dotting, for which a different shaped iron is used. I am an advocate for lines, which should be drawn obliquely or perpendicularly, as more favorable to contraction in the direction a bandage would take. And I may just repeat what I observed in the correspondence alluded to, that I am no advocate for carrying firing beyond the integument. I am aware,

however, there are many veterinary surgeons who differ from me on this point. I feel bound to confess my inability to perceive what possible advantage can be derived from so doing; the thickness of the horse's skin will always admit of firing deep enough to cause sufficient contraction for a bandage, be it temporary or permanent, or, on the other hand, a sufficiently active inflammation to excite absorption, and when we go beyond this, besides creating an unsightly blemish, we diminish the good we desire to effect.

However obscure the knowledge of the anatomy of the limbs of our domestic favourite may have been in times gone by, when firing, together with bleeding and physic, was the order of the day, modern science teaches us that it is still indispensable. But, gentlemen, I think she has also taught us that we are applying our instrument to not only sensitive, but in some cases highly organized structures, and that we may not bury our iron overhead into such structures with impunity. Let us, as Mr. Youatt nobly and wisely said forty years ago, ask ourselves the question, "Who gave us the right to inflict such horrible and protracted suffering?" We acknowledge the supremacy of man, but, if we understand the principles of all true government, the lowest are not abandoned to the caprice or cruelty of the highest. Counter-irritation, with sufficient inflammation in the neighbouring parts to produce absorption of the abnormal deposits, is what we require, and not increased inflammation in the diseased structure, and this idea was, I think, held in days long gone by, though the operation may not have been so scientifically performed as it now is.

Blundeville, in his work in the year 1556, in speaking of the cautery, quotes Avicenna as follows:—"How be it, you must be aware (sayeth he) that you touch not the sinews, chords, or ligaments, lest the member be weakened, or that cramp ensueth." Solleysell says, "Unless in cases of extream necessity you must *never pierce the skin.*" Blaine, in his 'Veterinary Art,' forty years ago, gave the same caution; and Professor Dick, in his manual of 1841, without speaking of passing beyond the integument, says: "*The skin itself* should never be deeply penetrated." So, gentlemen, you see I am not advancing a new idea. More than three hundred years ago, when veterinary surgery was scarcely in embryo, Blundeville cautioned his readers against deep firing, and the doctrine has been successfully upheld by eminent and scientific men to the present time. We do not want knitting-needle, or fantastical, but effectual and neatly done firing. Too often, I know, it is performed to please the eye rather than for its beneficial action.

But it is not my intention to trespass on your time in explain-

ing the mode of operating, but I must dwell for a few moments on the benefits accruing from the operation. Firstly, then, why do we fire? Answering this question professionally, we should not reply, as some have done, because they were desired by the owner to do so. No! We fire, I trust, because we consider it necessary, and for the following reasons:—To give strength and support to those structures which, through predisposition, abuse, or accident, have become abnormal, and for the removal by absorption consequent on the stimulus received, and prevention of the further growth of ossific deposits or otherwise. For instance, by using the actual cautery (firing-iron) to a bony enlargement we believe the counter-irritation set up externally is greater than the inflammation internally; and as inflammatory action cannot go on in two places at the same time with the same strength, the greater overcoming the lesser, the further development of the diseased structure is prevented or checked; and when the counter-irritation has subsided and the parts have commenced to heal, then the contraction of the skin on the burnt incisions produces a bandage and support, which remains through life, to that diseased part; or, as Mr. Blaine has it, "by tightening the skin we keep up pressure as a stimulus to future absorption, and gain a permanent bandage." We blister after firing, or use some more gentle irritant, to increase the action of the cautery and promote still more the absorption we wish to take place. This, of course, depends upon the nature of the case.

And this brings me to that portion of my paper to which I chiefly wish to direct your attention, viz. as to the after effects of this operation. Whether firing produces a permanent bandage or not I have answered already in the affirmative, but before proceeding with my own views I will take the liberty of quoting a few opinions from the discussion that followed the reading of Mr. Mayer's paper on "Actual Cautery and Setons," in the year 1837.

The late Professor Spooner, who was then Deputy Professor at the Royal Veterinary College, was, I believe, the only gentleman who repudiated the notion of firing acting as a bandage of any description, permanent or temporary; he said he looked upon the skin at all times as a salutary bandage, and not only an occasional but a permanent one, and that anything that was calculated to alter its normal condition or character could not be salutary, by which I opine we may assume he meant we destroyed a natural bandage in trying to produce an artificial one, instead of which I should submit we increase the strength of the former by adding the latter.

Mr. James Turner said with reference to the operation that the neurotomizing the part was the principal agent in the cure,

but still he had always thought that the artificial bandage produced was a most important agent in causing absorption of osseous or other tumours, and, in consequence of the thickening of the integument, and the powerful contraction of the ligament of the weakened joint, an artificial ligament was formed, a substitute for that which had become useless. Then (says he) comes the contraction of the skin on and around the part, establishing and rendering the cure complete.

Mr. Cheetham spoke of actual cautery as "one of the most powerful of remedies," and said, as to firing being a permanent bandage, there was no doubt about the matter. When (said he) the divided edges of the skin were brought together there must be compression of the parts beneath, or, in other words, there was a valuable and a powerful bandage, but he considered it only a temporary one.

Mr. T. Turner (especially alluding to deep firing, though I contend it equally applies to superficial) stated, in a case of his own, that the firing had produced absorption of the whole of the former thickening, and every cicatrix was as firm as a cricket-ball, and observed that any gentleman who saw it would no more doubt what a bandage and bracer it might become.

Mr. Youatt stated he was fully impressed with the benefit said to accrue to the fired parts from the old and new skin growing tight and inelastic, "and acting as a bandage upon them;" and then, in answer to Mr. Spooner, he says, for a while the skin is deprived of its action as a bandage (this is in deep firing), but at length these gashes begin to close, or, if Mr. Spooner likes it better, begin to be filled up by the process of granulation, filled up to a certain extent, filled up to the surface, and then (he observes) has he never watched the process of cicatrization in a wound? Little portions of skin form on the centre of it, and the sides of the wound creep and creep closer and closer together, and the skin steals along over the surface, and when the wound is healed the contraction of the part is as plain as anything can possibly be, and there is a ridge of contracted integument as hard as any cartilage, but with none of its elasticity; and this is not a temporary thing, it becomes tighter, harder, and more effectual every week and month and year; it *lasts during the life of the animal;* but mark, he says, "whatever mode of firing (deep or not) I adopt, I have this firm, invaluable pressure on the parts beneath, and than which I know of nothing more effectual in accomplishing the purpose I want—the strengthening of the parts that are weak, and the removal of those that are adventitious."

Mr. Mayer (the essayist) states: "Where the skin in healing is lessened in surface, it is tightened over the part, and acts as a salutary bandage."

Lastly, Mr. Percivall, in speaking of remedies for spavin in his work on lameness, says, why not blister or seton the hock? and replies, because neither blister nor seton is likely—has by experience been found—to confer that *lasting* benefit which the actual cautery has been proved to afford. And again, he says, in speaking of firing, "Another observation of the ancients, and one we have never lost sight of, it having been handed down to us from generation to generation, is the bracing and strengthening power of firing." Indeed, so strong was their faith in it that we are told the Arabians, Turks, and Italians, fired their steeds to strengthen their limbs; undoubtedly a mistake, for I fully agree with Mr. Percivall that no sound or normal parts can reap the same benefit from it; that, in short, we cannot improve that which is already of its kind, perfect. I ought to observe that, although Mr. Percivall believes in the bracing and lasting effects of firing, he does not argue that it is a bandage, but rather the contrary, as I shall presently show, though if it braces, it binds, bandages, affords a tightness, &c., according to the meaning of the word when used in that sense.

Firstly, then, the contraction of the skin alone (especially after deep firing), and remaining so contracted for ever after, is, I think, sufficient proof that it acts as a permanent bandage, for even the most eminent of our profession in the present day will not, I venture to say, contend that integument so operated on could ever resume its original state. But, gentlemen, as the incisions produced with the firing iron are healed, which I maintain they are, much more by contraction of the old structures than formation of the new, so must the neighbouring surface, by being drawn, become lessened and obviously a permanent bandage the result. In fact, it is a question in veterinary practice if this contraction does not continue, as it does in the human subject, even after the cicatrix is complete, and if so, the bandage must be rendered still more permanent. But, further, as the proof of the pudding is in the eating, so is the proof of the effect of cautery in dissection. If we examine a portion of fired integument after death (however long the operation may date back) we find it corrugated, denser, considerably thickened, and, compared with that which is natural, non-elastic, and from the fact of its being so thickened (which thickening must increase its strength) and remaining so until the end of the chapter, certainly conveys to my mind the idea that a permanent bandage must be produced. Mr. Percivall, however, in speaking of the tertiary or remote effects of firing, expresses himself as follows:—"I suspect," he says, "however, a good deal of fallacy in this assumption of 'bandage;' the inflammation so long pervading these parts has caused effusion of adhesive matter into the subcutaneous cellular

tissue, the result of which is agglutination of the cutis vera to the parts underneath—the periosteum, perichondrium, tendinous thecas, &c.—which agglutinated condition of parts it is that in the absence of the cellular connection through which they obtained motion one upon another previously gives the skin the sensation of being tightened or braced, relaxation of it not again taking place until the solid effusion into the cells of the subcutaneous reticular membrane become absorbed." Query.—Does it ever relax again? My experience and dissections certainly lead me to take the opposite view. If it did so relax then I could understand firing not producing a permanent bandage and the uselessness of the operation. When I see fired integument resume its original state then and only then will my opinion change. But, again, in the cicatrix that follows cautery is there not deposited more or less white fibrous tissue, a non-yielding substance, and which by very reason of its non-elasticity must aid in keeping tense the neighbouring skin? Will all the relaxation which Mr. Percivall speaks of as taking place remove this tissue, or form cicatrix, or counteract its power and give back to the skin its natural elasticity? Most assuredly not.

On the other hand, I have heard the argument used—in fact, taught—that there is a greater abundance of areolar tissue under the skin of a fired part than there was previous to the operation, and, therefore, we get a freer movement of the integument, if possible, than existed before. But will this *supposed* extra gliding movement make up for the loss of elasticity in the integument itself. Would not this increased formation of tissue underneath add to the pressure on the diseased structure and thus strengthen my view? What says Mr. Youatt in reply to Mr. Spooner, where the latter says, "No, there cannot be contraction, because I have always found a more than usual deposit of cellular texture beneath the integument, with numerous vessels that were never seen before ramifying through it." "Very true," answered Mr. Youatt, "there is this engorged state of the subcutaneous tissue; there are these vessels which spring up as it were by magic, the effect of inflammation in every part; but where are they placed? Why, between the skin artificially contracted by the application of the fire and the parts beneath, and thus by their interposition increasing the pressure on the enlargement or the exostosis beneath, and the absorbents of which we are endeavouring to stimulate to increased and efficient action."

Again, we have been told that the incisions are filled up by granulation, and, therefore, no contraction or displacement of the skin can take place. But, gentlemen, so much have the reproducing powers been weakened—I might almost say destroyed—by the application of the cautery that the little they produce is of

so slow a growth (and at the same time so imperfectly organized) as to allow of ample time (were it wanted) for an alteration in the structure and position of the neighbouring parts, and, therefore, is it unreasonable to assume that when once this alteration has taken place it is not likely to return to its original state. No; glued, grown as it were together, it remains so for life.

Vegetius, as quoted by Blundeville, over three centuries ago, says, "Actual cautery bindeth together parts loosened; yea," says he, "the holes being once closed and clean shut up, that place is stronger and better knit together, and covered with a tougher skin, than ever it was before."

Notice the human being that has been burnt, if it be only a single scar. Is not the integument drawn and its natural freedom of motion lost? All this then, gentlemen, tells me that firing, especially as we apply it, must produce a permanent if not at all times an effective bandage.

Lastly, there are those who contend that firing does not impede velocity of motion. True, the ancients fired their horses to strengthen their limbs, which when in a normal state was, as I have previously observed, a mistaken idea, and it is also true that fired horses have won many races; still, I do not think it any stretch of imagination to suppose the young thorough-bred does not move with the same freedom of motion in his wonderful speed over the course as when his limbs were unfettered with the bandage produced by firing. Certainly I should not expect him to move with the same fleetness after the deep cautery lesions of Mr. Turner; and if it does lessen speed, is it not a further proof, were one wanted, of the permanency of the bandage? Yet, as Mr. Blaine says, there must arise cases when, all other remedial plans having failed, it would be madness not to have recourse to this, even in the racer; and further, it being more used as a cure of disease than a prevention, we are undoubtedly warranted in having recourse to it even at the risk of diminishing the speed of the animal.

He who leaves the firing iron till too late is penny wise and pound foolish. We as veterinary surgeons know that the failure of cautery (particularly in breakdowns) is due to its not being had recourse to at the proper time. Bleeding from the toe days after the accident, fomenting and physic, then once, twice, if not thrice blistering, or, as is not unusual at the very onset, some irritating embrocation is applied, and when all the mischief that can be done is done the veterinary surgeon is called in and expected to produce with his irons a perfect cure, and afterwards in such instances his patient indeed looks (to use a slang expression) "a perfect cure" or a miserable makeshift, wearily dragging out his existence under the superintendence of Mr. Cabby.

In conclusion, gentlemen, it is, as I observed at the onset, to have your valuable opinions in the discussion that may follow that I have brought this subject forward. I have long felt a desire to know the ideas of my brother practitioners of the present day on this branch of our study. I may be told I have quoted old opinions; true, but they are the views of men who had made this subject their study, and heart and soul worked for the welfare of our profession, as I trust we are doing. I am also aware that the mode of operating in these modern times is vastly different to what it was in the olden ones, as also are the instruments used; the copper, gold, and silver knives with which Solleysel operated have given place to the more massive and effectual firing iron, but the effect we endeavour to produce is the same as in their day, added to which the public are more observant and, I think, more alive to the value of their horses. Veterinary science has at last made itself a name, and that name it behoves us all to uphold. I will not detain you further, except to thank you for the kind attention with which you have listened to me, and trust my feeble efforts may not have been in vain.

An interesting discussion followed. On the motion of Mr. Proctor, seconded by Mr. Bailey, it was resolved that the paper be sent for publication in the next number of the *Veterinarian*. A vote of thanks to the Chairman brought the meeting to a close.

THE SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

The Quarterly Meeting was held in the Ship Hotel, East Register Street, Edinburgh, on Wednesday, 3rd June, at half-past 2 o'clock, Professor Williams, President, in the chair.

Present—Professor Walley; Messrs. Robertson, Bosthwick, Aitken, Balfour, Baird, Brown, Black, Aiken (Edinburgh), Balfour (Markinch), Mills (New Veterinary College), and the Secretary.

Mr. A. Balfour, Jun., of Markinch, was nominated as a member of the Society.

With respect to the refusal of the Council of the Royal College of Veterinary Surgeons to grant the petition of certain students at the Veterinary Colleges for final examination in April last, the members were of opinion that, though the Council might be legally entitled to act as they had done, it would have been kinder and more equitable towards the students to have acceded to their request.

Mr. Robertson, of Kelso, directed the attention of the meeting to the condition of sheep-stock in the border counties during last winter and spring.

The sheep in these districts are chiefly Leicesters, Cheviots, and crosses between the Leicesters and Cheviots. The Cheviots are mostly confined to the hills, the other to the lower grounds. These different varieties may naturally be divided into two great classes, viz. feeding stock, those being prepared for the butcher, and store or breeding sheep. During the winter the greater number of both these classes are fed more or less largely on turnips, and in the case of those fattening there is an addition of such artificial materials as linseed and cotton-cake, oats, beans, and bran, &c. Of the several varieties of turnips, the most largely grown are the swedes. These are raised on lands which are, and have been for ages, enriched with as much farm yard and artificial manure as can safely be used. The sheep are folded on the turnips when they are grown. At first the roots are eaten as they grow, not pulled; afterwards they are pulled so as to secure them from frost, and given sliced in troughs, with or without the artificial food, as deemed best, and occasionally also some sort of fodder placed in ricks is allowed them.

The turnip crop, as is well known, was last year, both as regards quantity and quality, exceptionally good. The roots were well grown, fully matured, taken up in fine condition, and, owing to the mildness of the winter, perfectly unaffected by frost. Every one expected that there would be an exceptionally good season for both sheep and sheep-owners. The result has been that feeding stock have done fairly well, nothing like what was expected, and that store sheep have done very badly, a greater mortality having occurred in this class than has been encountered for many years, and that chiefly from one cause—anæmia.

The sheep were put in the turnip fields as usual, and shortly afterwards were observed not to be doing. They were dull, out of sorts, wool unthrifty and staring; they fell away in condition, while in some œdematous swellings made their appearance under the jaws, belly, and other parts. When these symptoms were observed in time, and the animals removed from the turnips and supplied with hay, oats, bran, and cake, and only a limited quantity of roots, they rapidly recovered; but when this was neglected they wasted away, and great numbers of them died.

Post-mortem examination showed great emaciation, tissues bleached-looking and bloodless, large blood-vessels nearly empty, scarcely as much blood in the body, in fact, as to wash one's hands with. Heart, lungs, stomach, bowels, kidneys, &c., comparatively healthy, but the liver invariably in a state of fatty degeneration, and in extreme cases almost a mass of fatty, oily material.

Mr. Robertson stated that this was not a case affecting a few scores of animals, but that, as hundreds had died from the same cause, it came to be a matter of very great importance. He was inclined to believe that the chief cause was the introduction into the system of an excessive quantity of saccharine material. The turnips, and especially the swedes, were exceedingly rich in quality, while, owing to the large quantities in store, sufficient fodder and artificial feeding had either not been given with them or the sheep preferred mainly to eat the roots. There would be thus an excessively large amount of saccharine matter continously introduced into the blood, and it was well known that when animals were fed exclusively on sugar or other saccharine substances anæmia and its effects soon followed, and these effects in some respects bore a considerable resemblance to those exhibited by the sheep in question. Still, he (Mr. Robertson) felt a difficulty in deciding whether the fatty degeneration of the liver should be looked on as the cause of the abnormal changes in the system, or simply as the result of these changes; and though he believed the saccharine material of the turnip to be the primary cause of the mischief, he was scarcely prepared to say, but would like very much to ascertain in what constituent of the root the hurtful principle lay.

Professor Walley was of opinion that the case was one in which the food supplied to the animals furnished a superabundant amount of certain of the constituents of the blood and a deficiency of others. He was inclined to attribute all such cases to the manure supplied to the lands on which the roots grew.

Mr. Robertson further stated that he had scarcely ever seen such a mortality among sheep from anæmia as this last season. In former years he had seen many die in somewhat similar yet dissimilar circumstances. As an instance, he mentioned the case of one of the largest sheep-owners, who, with a splendid stock, kept in first-class order, lost annually many ewes at the lambing season. The rye grass grown on the farm was generally very luxuriant, and as it was never eaten very barely down, it was always ankle deep at least on the field. And even at mid-winter there was always plenty of it, such as it was. On this the ewes were grazed, and, though supplied with turnips, cake and hay, took both little of them, preferring the grass. They did very well indeed till the lambing season came on, but parturition went hard with them, and many of them sank. It seemed to be a shock which they could not resist. They died rapidly, yet in first-rate condition, very fat indeed, and in each and all of them was fatty degeneration of the liver. This continued for some years, when, as a preventive, the plan was tried of "running up," *i.e.* of eating exceedingly bare a field of rye grass, turning the ewes on

to this, and supplying them with turnips, hay, and artificial feeding. The very best results followed, and the deaths were but nominal. The year before last, owing to a change of management on the farm, the old plan was resumed, when in the spring seven score of ewes succumbed. This winter the bare field and regulated diet were again adopted, and Mr. Robertson had the satisfaction of hearing that only two ewes had been lost.

Professor Williams said that he and the other members were very much indebted indeed to Mr. Robertson for introducing the subject. It certainly was a very interesting one and presented several peculiar features. There were two cases—in the one the ewes were fed on roots, unlimited as to quantity and particulary good in quality, and they died weak, emanciated, dropsical; in the other, fed on grasses, which, though abundant, could not, one would have thought, have been very digestible or nutritious, they were found after death to be plump, fat, and in good condition, yet in both instances was there fatty degeneration of the liver. Now, fatty degeneration of the liver was of two kinds—in the first he believed the fat was only deposited in and around the lobules, without much, if any, structural change in these lobules and surrounding tissue; while in the second the lobules and structure of the organ had really undergone a change and degenerated wholly or partially into fatty tissue. Both, he believed, frequently depended on the food; in the one the fat was only deposited on the liver as in the other tissues of the body, and if the cause could be removed and the circumstances changed it was possible the animal might recover. The constituents of the food necessary for the formation of blood were at least of three kinds—the nitrogenous, the carbonaceous, and the saline; and the excess of one or more of these, and a deficiency of the others, produces serious derangement in the system. In the case of the ewes fed on turnips he was of the same opinion as Mr. Robertson, that the primary cause was the rich quality of the roots. Saccharine matter in excess, causing a preponderance of the hydro-carbon, which, not being required by the system and the blood, was deposited as fat in the liver, causing, first, functional derangement, and then structural change in the organ, and subsequently anæmia and death.

Mr. Balfour, of Kirkcaldy, described a severe case of indigestion from an overdose of potatoes, which relieved itself by spontaneous vomiting and purging.

Mr. Black, of Howgate, kindly consented to introduce a paper at the next meeting.

C. CUNNINGHAM, *Secretary.*

SLATEFORD,
June 15th, 1874.

PARLIAMENTARY INTELLIGENCE.

FOOT-AND-MOUTH DISEASE.

June 2nd.

Lord Henry Thynne asked the Vice-President of the Council whether his attention had been directed to the serious outbreak of foot-and-mouth disease in Wiltshire and Dorsetshire; and whether he would take into his immediate consideration what steps might be necessary to check the disease, and especially the desirability of sending down an inspector at once to report thereon.

Lord Sandon.—Owing to the prompt action of my noble friend the member for South Wilts, the Lord President was informed immediately yesterday of the outbreak of some serious form of disease among the cattle in Wilts and Dorset. The same afternoon an inspector was instructed to visit the locality and to report as soon as possible the result of his inquiry. No report has been received from him up to the present time, but he has been instructed to telegraph as soon as he has ascertained the real character of the disease, and I shall be happy to inform my noble friend what we hear.

June 15th.

Lord Sandon informed Mr. Barclay that, after the report of the Committee of last year, the orders relating to the foot-and-mouth disease were revoked, but, owing to a serious outbreak of the disease in various parts of England and Scotland, the Lord President had felt it his duty to revert again to the former order. Steps were in contemplation with a view of carrying out more efficiently the inspection of animals from Ireland.

House of Commons—*June 15th.*

Mr. J. Barclay asked the Vice-President of the Council whether the Order in Council recently issued relative to the foot-and-mouth disease was in accordance with the recommendations of the Select Committee on Cattle Diseases of last session, and whether a copy would be laid upon the table of the House.

Lord Sandon.—After the report of the committee, the previous orders relating to foot-and-mouth disease were revoked; but, in consequence of a serious outbreak of that disease in various parts of England and Scotland, the Lord President thought he could not do otherwise than revert to the former regulations, and authorise the local authorities in any district to take measures to prevent the spread of the disease. He hopes that this deviation from the recommendation of the Select Committee will not cause inconvenience. I may add that the Lord President has been in communication with the Chancellor of the Exchequer, with the view of carry-

ing out more effectually the system of inspection of animals landed from Ireland.

CATTLE DISEASE.

HOUSE OF LORDS—*June 19th.*

The Earl of Kimberley, on rising to put a question on this subject, said that last session a committee of the other House of Parliament was appointed to inquire into the operation of the Act applying to diseased cattle. That committee made some very important recommendations. In pursuance of these recommendations the compulsory slaughter at the landing place of foreign animals affected with pleuro-pneumonia had been rigorously enforced, and the order issued by the Privy Council last year in respect of the foot-and-mouth disease had been withdrawn; but no step had been taken to enforce such compulsory slaughter in Ireland. He believed one of the reasons for that was a difficulty arising from the want of proper machinery, and another was a defect in the Act providing for the payment of compensation in the case of animals slaughtered under the compulsory order. But he wished to point out that great inconvenience and danger resulted from having one set of regulations in this country and another and a different set in Ireland. To allow animals to come into this country from Ireland when the compulsory slaughter of diseased animals was not carried out in that country, while it was enforced here, was like letting water run out at one end of a cask while it was poured in at the other. He did not mean to say that the number of diseased animals was proportionately greater in Ireland than in this country, but there must be disease among the cattle there, and he knew that thousands of Irish beasts came over to Norfolk every year. There was great difference of opinion as to whether compulsory slaughter was likely to stamp out the disease, but there was a concurrence of opinion that to be of any use the regulation must be stringent. The experience of other countries showed that partial measures were of no use. As regarded the foot-and-mouth disease, the committee of last year was of opinion that we had no means of stamping it out without the adoption of more stringent regulations than could well be put in force in the case of such a disease. His noble friend the President of the Council had recently made an order for certain regulations in respect of the disease, but he concurred with the committee in thinking that such regulations would be of no use. He begged to ask the Lord President whether it was the intention of the Government to take steps to carry into effect the recommendation of the Select Committee of the House of Commons of last session, that the regulations in Great Britain and Ireland with regard to contagious diseases of animals should be similar.

Lord Dunsany would remind the noble earl who had just spoken that the circumstances of the two countries were different. Ireland was an exporting and not an importing country, in respect of cattle. He had heard from the noble viscount opposite (Lord

Portman), who was a good authority on such matters, that a number of cattle which had left Ireland in a healthy state were found to be diseased when they arrived in Dorsetshire. This was attributed to the treatment they had sustained on the journey. Sufficient attention was not paid to the cleansing of cattte trucks and the supplying of the animals with food and water while on their journey. He did not believe that unhealthy cattle were exported from Ireland to this country.

Viscount Portman was of opinion that a great deal might be effected by stringent regulations in the case of pleuro-pneumonia. There could be little doubt that disease was propagated by animals being put on board vessels and into railway trucks which had not been properly cleansed after they had been occupied by other animals which had, perhaps, left after them diseased saliva. Animals on their journey ought to have food and water; but frequently they were left without either. The farmers in his part of the country would have preferred being left alone rather than that the recent regulations as to the foot-and-mouth disease should have been sent down to their part of the country.

The Marquis of Bath must differ from the noble viscount. He believed the farmers in Wilts and Somerset would not have preferred to be left without these regulations. They wanted to be protected against persons who brought diseased cattle into the country.

The Earl of Airlie thought that stringent regulations in respect of pleuro-pneumonia would be as much for the interest of the Irish breeder as for that of the English dealer and the Scotch dealer.

Lord Egerton was of opinion that in some districts of this country there had not been sufficiently stringent action on the part of the local authorities.

The Duke of Richmond said this is a most difficult subject. The opinion just expressed by noble lords on both sides were as much at variance as any opinions could be. Then, what had happened at the Privy Council Office since he came into office? He had received one deputation who requested him to do away with all restrictions, and based the request on the ground that the country would not stand such interference with the supply of food to the people. The policy recommended by that deputation was that the disease should be allowed to take its course, and the animals to take their chance. But no sooner had he civilly bowed out these gentlemen than another deputation presented itself, and the gentlemen composing it urged that it was the duty of the Privy Council to issue the most stringent regulations, as the supply of animal food to the large masses of the people depended on the stamping out of the disease, which could be effected only by such regulations. There had also been contrary utterances from different societies, and at a meeting of a society which ought to be an authority on such subjects—the Royal Agricultural Society of England—a motion for a deputation to him with the view of urging the reimposition of a regulation which had been relaxed was carried

by only the casting vote of the chairman. With regard to Ireland the power of issuing an order for compulsory slaughter was vested in the Lord-Lieutenant in Council; but one difficulty arose from the fact that in Ireland there was no "local authority," and it devolved upon the constabulary to carry out the orders of the Irish Privy Council. The constabulary were obliged to employ inspectors, who were not as numerous in Ireland as in this country. Again, up to almost the present time there was a difficulty in regard of compensation, which difficulty arose from a doubt as to the wording of the Act. He had brought in a bill which had passed through both Houses to enable the Irish Government to overcome that difficulty. He believed, therefore, that there was no necessity for further legislation to enable the Irish Government to make an order for compulsory slaughter and to compensate the owners of the animals. A deputation appointed by the quarter sessions of the West Riding of Yorkshire waited upon him yesterday to complain that compulsory slaughter put that Riding to a great deal of unnecessary expense. He could not say that he agreed with the views put forward by that deputation. On one point there might be a great improvement in Ireland. There should be a better inspection of cattle there, and in order to effect that object he had been in communication with his right hon. friend the Chancellor of the Exchequer, whose concurrence in the appointment of additional inspectors it had been necesary for him to obtain. As to what his noble friend (Lord Portman) had said respecting the regulations in his part of the country, he must pair him with his noble friend the noble marquis who had followed him in the debate. He had done what appeared to him to be the best under the circumstances. There was an outbreak of the foot-and-mouth disease, an order was issued reimposing the Order in Council which gave the local authorities power, where they thought fit, to deal with that disease. The order did not impose compulsory regulations on every county, but it enabled the local authorities to deal with it when there was a considerable outbreak of the disease. It was true the committee of last session came to the conclusion that unless measures of a very stringent character, such as this country would not like to agree to, were adopted, it was better to have no regulations with respect to the foot-and-mouth disease. He had very generally followed that recommendation, and had done as little as possible unless in cases in which he thought some action was absolutely necessary. He was aware that there were two parties to be considered—the consumer and the producer—and he had no desire whatever to harass the latter.

DISEASED CATTLE.

HOUSE OF COMMONS—*June 22nd.*

Lord Sandon, replying to Mr. Kavanagh, stated that it was the fact that on the 3rd instant 200 oxen were landed at Thames Haven from Oporto, off a vessel called the Olga. They were inspected and certified free from infectious disease. They were exposed for sale

in the Foreign Cattle Market, and six of them were seized. On the 8th eleven beasts, forming part of the cargo of the Olga, were seized and slaughtered. There was no reason to believe that the foot-and-mouth disease was imported in the Olga.

IMPORTATION OF IRISH CATTLE.

Mr. Cogan asked the Vice-President of the Council whether the resolution which it had been stated the Lord President had arrived at of requiring a more stringent inspection of animals imported into this country from Ireland had arisen from the prevalence of any cattle disease in that part of the United Kingdom; if so, could he state in what part of Ireland such disease prevailed, and the nature of and the number of cases that have been reported for each of the last four weeks; and if there be no such prevalence of disease, on what grounds had it been deemed necessary to impose new restrictions on the importation of Irish cattle?

Lord Sandon.—Sir,—The proposed inspection of animals landed from Ireland has not been decided upon on account of any fresh outbreak of cattle disease in that country. It is not proposed to impose new restrictions on the importation of Irish cattle, but merely to ascertain that the regulations at present in force are effectually carried out. The Lord President is only acting in accordance with the recommendation of the Committee of the House of Commons, 1873, which reported as follows on this subject:

"That the Orders of Council relating to the transit of animals both as regards disinfection and the prevention of cruelty and suffering appear to be well adapted for these purposes, but your Committee are of opinion that such orders cannot be satisfactorily carried out without inspection from time to time by the officers of the central authority of vessels engaged in the Irish and coasting as well as in the foreign trade."

CONTAGIOUS DISEASES (ANIMALS).

House of Commons—*June 26th.*

Mr. J. W. Barclay rose to call the attention of the House to the recommendations of the Committee which sat last session upon the subject. The Committee was presided over by the Vice-President of the Council, the right hon. member for Bradford; they sat twenty-eight days, examined a great number of witnesses from England, Scotland, and Ireland, and in most of their recommendations they were practically unanimous. The late Government at once took action on the subject, and an Order in Council was issued, making it imperative that all cattle labouring under pleuro-pneumonia should be slaughtered and that their owners should be compensated. The present Government, however, had not adhered to the recommendations of the Committee, but had recurred to the former system. The resolution of which he had given notice was moved in no spirit of hostility to Ireland. The farmers of England and Scotland depended upon Ireland for their store cattle. But it was most important

that the cattle of Ireland should have the best character for soundness. Any suspicion on that subject would depreciate their value at least ten per cent. in the market. He therefore strongly urged the Government to carry out the policy of stamping out pleuro-pneumonia simultaneously in the United Kingdom. If the Government contemplated increasing the power of inspecting Irish cattle on the side, he wished to say he thought that would be a decided mistake, for if diseeased cattle had come across with sound cattle, the evil had been done before the cattle were landed, while the development of the disease was so slow that an experienced veterinary surgeon could not detect it without a protracted quarantine. The Committee unanimously thought that inspection should be made as thorough and effective as possible before cattle were put on board, and that we could both prevent dealers bringing unsound cattle for shipment and enable inspectors to prevent those that were diseased from being forwarded to the Eglish market. He hoped the Government, instead of going back, would follow out the policy indicated by the Committee. Information from various parts of the country gave rise to an apprehension of a somewhat extensive outbreak of a pleuro-pneumonia, and pressure would soon be put upon the Government to deal forcibly with it. It would not be just if, while English and Scotch local authoritles were obeying orders in council and farmers were slaughtering animals, in Ireland the state of matters remained unchanged and cattle were freely brought over to this conntry. As he would not be in order in moving the resolution of which he had given notice, he must be satisfied with pressing his views on the Government.

Mr. Cogan called attention to the distinction which the Committee drew between pleuro-pneumonia and foot-and-mouth diseatə as demanding different modes of treatment, deprecated the renewal of orders in council, and advocated inspection at the port of embarkation, even in the interest of the Irish cattle dealers, to whom it was of vital importance that Irish cattle should have a good character in this country, and to whom it was a greater hardship to have their cattle confiscated, after the cost of the voyage had been incurred, and on the authority of an inspector, than it would be to have them destroyed at home.

Mr. Stewart was opposed to creating a staff of inspectors, for whom ordinarily, there would be no employment, and thought it of great importance that on the outbreak of disease notice should be at once given to the police. It was desirable that power should be given by the Privy Council to the local anthorities for the removal of animals. In the middle of winter, when the foot-and-mouth disease was raging, a farmer asked him whether he could remove his sheep from a particular field; but the local authority had no power whatever to allow the animals to be removed from a place in which they must have inevitably perished of hunger at such a period of the year. There was one point which was very deserving of notice, and that was that

there should be a closer inspection when cattle were about to be embarked. He lived in a part of Scotland to which there was a large trade from Ireland, and they were very much afraid of the introduction af disease.

Mr. Kavanagh agreed very much with the spirit of the recommendation of the hon. member for Forfarshire, though to some part of their wording objection might be taken. If it were found possible to assimilate the regulation of Great Britain and Ireland, it would, in his opinion, be very desirable. With regard to the foot-and-mouth disease, most of the restrictions which might be enforced in England were optional with the local authorities. It was hardly to be supposed, therefore, that they were very similar all over England, and if so it would be very difficult to make them similar all over Ireland. With respect to pleuro-pneumonia, he wished the provisions as to slaughter could be extended to Ireland.

Mr. Evans admitted that the interests of all parts of the United Kingdom on this subject were the same. The county of Derby, which he had the honour to represent, would be seriously inconvenienced if the importation of cattle from Ireland were stopped. Although the regulations as to compulsory slaughter were inconvenient, yet on the whole the result had been beneficial in Derbyshire, and he thought local authorities should have the power of putting those regulations in force. A strong opinion existed among all those who were engaged in agriculture in Derbyshire that the foot-and-mouth disease was spread more by the railway tructs in which cattle were conveyed than by any other cause, and that it was necessary to have more stringent regulations on that subject.

Lord Eslington did not think that many diseased cattle were exported from Ireland. As a rule, he believed that Irish cattle were sound, and he was not in favour of prohibiting the importation of Irish cattle into this country. But his main object in rising was to support the resolutions which the hon. member (Mr. J. Barclay) had proposed, because he thought they were a practical remedy. The Government were asked by that proposition to enforce a more vigilant inspection of cattle at the port of embarcation and at the port of landing. Two years ago the Royal Agricultural Society Commissioned their secretary, a very able man, to make careful investigations for six or eight weeks with regard to the foot-and-mouth disease. The secretary published a report of his investigations, which was a text-book on the subject. He ascertained that the disease was the consequences of neglect and of a want of care in the transit of cattle, that the railway trucks were not sufficiently clean, that the animals were very often starved and then sent long distances without proper attention. Whether the disease was pleuro-pneumonia or foot-and-mouth disease, the pecuniary losses occasioned by it annually were enormous. It was, thsrefore, most important that there should be a careful inspection at the ports of landing in this country and

he hoped the Government would seriously consider this matter.

Mr. Dodson pointed out that there were great practical difficulties in dealing with the case of Ireland in respect to the slaughter of cattle at the previous points suspected to be suffering from pleuro-pneumonia. Those difficulties arose from the absence of a local authority in the country and the obstacles which stood in the way of obtainng properly qualified inspectors, the result being that it was found necessary to rely on the Constabulary to act in that capacity. There were no doubt considerable difficulties and as hon. members connected with England and Ireland had now spoken in the matter he hoped some member of the Government would at once rise and announce to the House his views which they entertained on the subject.

Sir M. H. Beech said he did not know that he need dwell on the first resolution which had been placed on the paper by the hon. member for Forfarshire. If the regulations between Great Britain and Ireland with respect to the cattle were not of an entirely satisfactory character, that was hardly the fault of the Irish Government. There was, at all events, a uniform system in Ireland, which was very much wanted in Englan, and to the absence of which very many of the difficulties which arose in this country in connection with the subject was attributable. He did not doubt, he might add, that several hon. members who had spoken in the course of the discussion fully appreciated the difficulties which stood in the way of the compulsory slaughter of cattle shipped from Ireland. The right hon. gentleman who had just spoken referred to the undoubted deficiency in that country of properly-qualified inspectors, who would see that the cattle slaughtered were really affected with pleuro-pneumonia. But he had not alluded to another point which made the difficulties greater, and that was that the funds out of which compensation would have to come in Ireland would be levied in the shape of a national rate, and not out of the rates of any particular locality. He wished the house to bear those facts in mind before they blamed the Government for not taking hasty action in the matter. Again, if the undoubted want of properly-qualified inspectors were supplied by sending veterinary surgeons over from England with large salaries, an enormous expense would have to be incurred. If such a staff were not established, the constabulary would have to be employed, and, however well qualified they might be for the discharge of their ordinary duties, he was afraid they would hardly be the most competent persons to distinguish pleuro-pneumonia from any other form of cattle disease. Thus there might be a system of slaughter which would be practically unchecked, and there would be, he thought it was evident under those circumstances, great obstacles in the way of applying compulsory slaughter for pleuro-pneumonia to the case of Ireland. Then came the question whether the system had been successful

in those countries to which it had been applied. He believed it had been tried in several countries of Europe, and had, after a fair trial, been abandoned because of its enormous expense. It had not, he might add, during the time it had been tried in England, nine or ten months, been so successful in checking the spread of pleuro-pneumonia as had been anticipated. The disease, he might further observe, according to recent returns furnished by the Veterinary Department of the Irish Govenment, prevailed only to a very small extent indeed in Ireland. There were, he believed, only seventy-five separate farms in Ireland in which the disease at present existed. It was said, no doubt, by those connected with agriculture in England that a great amount of the disease which prevailed in this country was due to its impotation from Ireland, but those who were conversant with agriculture in the latter country would not, he believed, concur in that view. He thought it by no means improbable that, owing to the value which was set on Irish cattle in the market, cattle which was sold as such in England and Scotland never left Great Britain. The voyage across the channel, too, and their conveyance in cold trucks rendered, he believed, cattle which had not been previously well fed liable to contract disease on their arrival in England, and it was hardly fair, therefore, to accept to the full the statements which were made on this side of the water as to the importation of pleuro-pneumonia from Ireland. As to the system of inspection, he admitted the difficulty of getting proper inspectors at the ports of embarcation, but the Irish Government were prepared to use their best endeavours in the matter. The proper place for the inspection of exported cattle was at the port of exportation. (Hear, hear.) When any animal leaving an Irish port was suspected of having an infectious or contagious disease it was at once seized, and was branded with a mark which would make it possible afterwards, by application to the Veterinary Department of the Irish Government, to find out the date and place of its shipment, and the very farm from which it had come. But, although this was the case, no single complaint had been made to the Veterinary Department; and if disease was imported so largely as was alleged, it was strange that there had been no complaints. He quite agreed that the disease should be checked in every possible way, so long as they did not unduly interfere with a trade which was mutually advantageous both to Ireladd and to England, and that it was the duty of the Irish no less than of the English Government to carry out that object in every way comptible with the interest of the country and the economical management of the funds entrusted to their care. (Hear, hear.)

Mr. Synan held with respect to foot and mouth disease that no other measure was necessary than a strict inspection at the ports. (Hear, hear.) There would be no difficulty in finding proper inspectors, provided they were paid. With regard to pleuro-pneumonia, whenever the police in Ireland learnt that that disease existed on a farm a cordon was drawn round the farm and

no cattle were allowed to leave it. The Irish farmers were in favour of compulsory slaughter, but thought they were entitled to compensation. At present they were practically compelled to slaughter without receiving any compensation.

Mr. Storer testified that there had been great loss both in the Western and Midland Counties from pleuro-pneumonia imported by Irish cattle. It might be that the cattle were healthy when they left Ireland, for he was aware of cases in which the disease seemed to have been got from railway carriages. As to the precautions which ought to be taken he thought the Privy Council should enforce a uniform system instead of leaving different local authorities to enforce different regulations.

Lord Sandon said the result of the discussion had been to show the importance of giving to the Government as much power as possible to inspect cattle both at the ports of embarcation in Ireland and at the ports at which they were disembarked in England and Scotland. On this point the Lord President of the Council was taking very active steps, in conjunction with the Chancellor of the Exchequer, to carry into effect what seemed to be the wish of the House. The Lord President was also giving attention to the question of improving and inspecting the railway trucks used in the conveyance of cattle, and he hoped good results would follow from the steps to be taken in reference to this matter also. With regard to the general question of the treatment of cattle diseases, he should say nothing at that late hour,—in the first place, because it was not raised by the motion of the honourable member for Forfarshire (Mr. Berclay), and, in the second, because there existed wide difference of opinion among competent authorities on the subject, both in that House and out of it. The Lord President would keep steadily in view the one great principle, that the great object of checking cattle disease was to provide a supply of food for the people rather than to promote the interest of cattle breeders and dealers.

Mr. O'Connor denied that the general opinion of the House as to inspection went beyond inspection at the port of embarcation, and contended that all the evidence at present taken on the subject had gone to show that Irish cattle were not more extensively subject to disease than animals bred and sold in either England or Scotland. He approved the proposals made by the chief secretary for Ireland, and hoped they would be carried into effect without delay.

Mr. S. Crawford said the precautions taken in the county Down had been effectual in stamping out disease among the cattle there, and he believed very few affected animals were sent from that part of the country either to England or Scotland.

ORDER OF COUNCIL.

At the Council Chamber, Whitehall, the 3rd day of June, 1874.

By the Lords of Her Majesty's Most Honourable Privy Council.

PRESENT: Lord President, Lord Sandon.

The Lords and others of Her Majesty's Most Honourable Privy Council, by virtue and in exercise of the powers in them vested under The Contagious Diseases (Animals) Act, 1869, (in this Order referred to as the Act of 1869,) and of every other power enabling them in this behalf, do order, and it is hereby ordered, as follows:

1. This Order may be cited as the Foot-and-Mouth Disease Order of 1874.

2. Words in this Order have the same meaning as in the Act of 1869.

3. Articles 19, 27, and 28 of the Animals Order of 1871, shall have effect as if the Animals (Amendment) Order of 1873 had not been made.

4. Nothing in this Order shall revive any Regulation made by a Local Authority which was revoked by the Animals (Amendment) Order of 1873.

5. Article 28 of the Animals Order of 1871 shall extend to authorise a Local Authority to make regulations for prohibiting or regulating the movement, as therein provided, of any animal affected with foot-and-mouth disease; but nothing in this Order, or in any regulation of a Local Authority thereunder, shall be deemed to authorise the movement of any animal in contravention of section fifty-seven, or of any other provision of the Act of 1869.

6. Article 5 of the Animals (Amendment) Order of 1873 is hereby revoked.

When an animal becomes affected with foot-and-mouth disease while exposed or placed or being carried, led, or driven, as in section fifty-seven of the Act of 1869 mentioned, it may, notwithstanding anything in that section, be, with a licence of an Inspector of the Local Authority authorised to issue the same, but not otherwise, moved for purposes of feeding, or watering, or other ordinary purposes connected with the breeding or rearing of animals, to any land or building in the occupation of the owner of the animal, or for slaughter to the nearest slaughter-house or some other slaughter-house approved by the Local Authority.

The form given in the Schedule to this Order, or a form to the like effect, with such variations as circumstances require, shall be used. (Signed) ARTHUR HELPS.

*No.

Dated this day of 18 .

Name and address of owner, or his or her agent

Number of animals

Description of ditto

Route :

From

Through

To

Purposes

[To be signed]

* This number must correspond with that on the Licence.

This counterfoil is to be retained by the person granting the Licence.

Caution.—Persons fabricating or altering or committing other offences with respect to Licences are liable, under The Contagious Diseases (Animals) Act, 1869, to fine or imprisonment.

SCHEDULE.

Form of Licence.

FOOT-AND-MOUTH DISEASE.

Movement Licence.

*No.

I, *A. B.*, of , being an Inspector authorised by the Local Authority of the of to issue Licences under Article of The Foot-and-Mouth Disease Order of 1874, for the movement of animals becoming affected with foot-and-mouth disease while exposed or placed or being carried, led, or driven, as mentioned in Section 57 of The Contagious Diseases (Animals) Act, 1869, hereby license the person undermentioned, being the owner of the undermentioned animals, or his [*or* her] agent, to move the said animals from to by the undermentioned route for the undermentioned purposes :

Number and description of animals.	Name and address of owner, or his or her agent	Route to be taken.	Purposes for which movement is licensed.	Remarks.
		From Through To		

The time allowed for removals under this Licence is two days, from and after to-day.

[To be signed] _____

Inspector.

Dated this day of 18 .

* This number must correspond with that on the counterfoil.

Caution.—Persons fabricating or altering or committing other offences with respect to Licences are liable, under The Contagious Diseases (Animals) Act, 1869, to fine or imprisonment.

EDINBURGH VETERINARY COLLEGE—RESIGNATION OF PRINCIPAL FEARNLEY.

The Edinburgh Courant of June 4th says—We understand that Mr. Fearnley, Principal of the Edinburgh Veterinary College, has sent in his resignation to the members of the Dick Trust. Mr. Fearnley was appointed Principal of the College in September last, as successor to Principal Williams; and it is said that he has been forced to take his present step by the persistent interference of several of the trustees and others, who virtually assumed the duties of Principal. He had frequently complained of the conduct to which he had been subjected, but hitherto without redress: hence his resignation.

In the letter sent to the Dick Trust Mr. Fearnley states that ever since his appointment events were constantly happening which made it painfully evident to him that he had neither the support nor the confidence of the trustees. That being so, he had either to resign an anomalous position or lose his self-respect, and as he preferred to retain the latter he had sent in his resignation.

The Glasgow News, June 18th, adds—That since the resignation of Mr. Fearnley, Principal of the Clyde Street Veterinary College, there has been a movement among the veterinary profession and the agriculturists near Edinburgh to secure the services of Mr. Williams, the late Principal, as his successor. By this appointment there would be a fusion of the two colleges, which would enjoy the advantage of a head possessing the highest qualifications as a lecturer, administrator, and practitioner. Principal Fearnley has become a student of medicine in Edinburgh University.

ROYAL VETERINARY COLLEGE.—BOTANICAL EXCURSIONS.

The class in connection with the Royal Veterinary College resumed their studies in the field, on the 30th of May, by a visit to Osterley Park. It was observed that very little progress had been made in the vegetation, and but few of the plants observed in bloom were different to those already recorded as gathered during the three previous excursions (pp. 461—3). A few yards beyond the

Ealing Station specimens of *Geranium pyrenaicum* were observed on the right bank of the railway, in full flower, and several examples of *G. lucidum* were also plucked. The hedge Bryony (*Bryonia dioica*) had flowered, but the Bitter-sweet (*Solanum dulcamara*) was still in a very backward condition. Amongst the other plants gathered in flower were *Ranunculus sceleratus*, *Lonicera periclymenum* and *Iris pseudacorus*. Several meadows in the valley of the Brent, near Hanwell Church, had evidently suffered much from the abundance of yellow rattle (*Rhinanthus*), which for several seasons past we have noticed as becoming more and more injurious to the hay crop in that locality. In the parish of Norwood we hoped to have gathered specimens of the bright yellow nettle (*Galeobdolon*), but in the copse, where it has been known to flourish for years past, not a trace of the plant could be found. The class, as usual, paid considerable attention to the common forms of grasses, but as regards the more attractive herbaceous phanerogams this excursion proved the least productive of our various walks. Forty pupils and friends were present.

On the 6th of June a small section of the class visited Maidenhead, Cookham, and Marlow Woods; this excursion, from a botanical point of view, proving by far the most instructive of the season. The smallness of the attendance was probably due to the circumstance that the Great Western Railway Company did not offer us such satisfactory accommodation as had been courteously afforded us by other companies. Alighting at Maidenhead at half-past 3 p.m., the party walked through the town, and thence by the left bank of the river to Ray Mills, Formosa, and Cookham Dean, fortunately arriving at the Marlow Woods just before it was too dark to recognise some of the more delicate sylvan species, such for example as *Melica nutans*, *Asperula odorata*, and *Sanicula Europæa*. One of the most attractive herbs found in the woods was the large *Cephalanthera* (*C. grandiflora*), its creamy white flowers readily attracting the eye when it became almost too dark to notice anything else. The meadows opposite Cliefden were quite like a garden from the prevalence of several highly coloured herbs, amongst which the clustered Campanula (*C. glomerata*) held the foremost place. Of the variety of plants gathered on this occasion, some notion may be formed by the mention of the following species:—*Caltha palustris* (with its follicles in every stage of dehiscence), *Nymphæa alba* and *Nuphar lutea* in full bloom; *Fumaria officinalis* and *Nasturtium palustre*, *Lychnis flos-cululi* and *Silene inflata*, *Stellaria aquatica* and *Hypericum perforatum* (the latter scarcely in flower), *Linum catharticum* and *Malva sylvestris*, *Geranium pratense* and *Trifolium incarnatum* (cultivated specimens), *Lotus major* and *Lathyrus pratensis*, *Spiræa ulmaria* (scarcely out) and *Geum urbanum*, *Sanguisorba officinalis* and *Eupatorium cannabium* (just coming into flower); *Scrophularia aquatica*, and *Epilobium hirsutum* (the latter not actually in flower), *Daucus carota* and *Conium maculatum* (this well-

known poisonous umbellifer being found by Mr. Wolstenholme in the Cookham Dean lanes, in fine condition, four feet in height, and just coming into flower); *Heracleum sphondilium* and *Chærophyllum temulum*, *Cornus sanguinea*, *Galium verum* and *G. cruciatum*, *Valerianella olitoria*, and *Dipsacus sylvestris* (with the flowering heads just commencing to form), *Artemisia absinthium* (not out), and *Senecio jacobœa*, *Centaurea nigra* (scarcely in flower) and *Tragapogon pratensis*, *Lapsana communis* and *Myosotis palustris*, *Symphytum officinale*, *Alisma plantago* and *Linaria vulgaris* (neither of the latter two being yet in flower); besides several Potamogetons, rushes, sedges and grasses. Of the latter, great quantities of *Briza media* were gathered, in addition to examples of the genera *Phleum*, *Anthoxanthum*, *Alopecurus*, *Agrostis*, *Poa*, *Hordeum*, *Triticum*, *Avena*, *Holcus Lolium*, *Bromus*, *Cynosurus*, *Dactylis*, *Melica*, and the common reed (*Arundo phragmites*). Altogether this was one of the most enjoyable and profitable botanical walks that we have had in the neighbourhood of London, and it is only to be regretted that the railway accommodation was not of a character more calculated to meet the exigencies of our case.

The last excursion took place on the 13th of June, when forty-five pupils spent the afternoon at Southend. Besides the strictly maritime species, many other plants were gathered which had not been encountered in the previous excursions, though several of them were common herbs. Amongst these were *Convolvulus arvensis*, *Anagallis arvensis*, *Reseda luteola*, *Silene inflata*, *Melilotus officinalis*, *Lepidium campestre*, *Medicago denticulata*, *Sonchus asper*, *Salvia verbenaca*, *Lathyrus nissolia*, *Linum usitatissimum*, and a remarkably fine specimen of the black bryony (*Tamus communis*) which was carefully studied by the pupils, side by side with the totally distinct hedge bryony so often noticed before. A few years back, the sands towards Leigh used to display some very fine examples of the yellow-horned poppy (*Glaucium*), but year by year these have gradually disappeared, so that we obtained but a single stunted specimen. This was found by one of the pupils (Mr. Oliver) after considerable search. Of the maritime species, we gathered *Triglochin maritimum*, *Armeria maritima*, *Glaux maritima*, *Eryngium maritimum*, *Honckenya peploides*, *Plantago maritima* and *P. coronopus*, *Beta maritima*, *Spergularia marina*, *Atriplex portulacoides*, and *Salsola kali*, the latter two not being yet in flower.

Some of the pupils collected a few marine animals (*Cyanæa aurita*, *Carcinas mœnas*, *Littorina littorea*, *Cardium edule*, &c.), which formed interesting subjects of discussion; particular attention being also directed to the parasitic character of the boring sponge found in oyster shells (*Cliona*). Various zoophytes and algæ were also examined (Fucus, Ulva, Enteromorpha, &c.).

It only remains for us to express our grateful thanks to the General Manager of the London, Tilbury, and Southend Railway, for

the liberal accommodation afforded to the class on this occasion. Mr. J. Louth, and all those who acted under his instructions, seemed anxious to do everything in their power to render our final excursion, what in fact it proved to be, a great success.—T. S. C.

LETTER FROM MR. W. A. COX RELATIVE TO THE ENTRANCE OF MEDICAL STUDENTS AT THE COLLEGE.

Gentlemen,—In cases where a medical student has "taken out" all his lectures more than five years ago, will it be necessary, before he can enter the Veterinary College, to again matriculate, and upon what subjects?

It seems a hardship to class them amongst those who have had no previous training or stood the test of an examination, as they cannot so soon have forgotten the fundamental principles required. I think that such matriculatory papers as those I mention, if sent to any college of surgeons, would be sufficient; surely, then, they ought to suffice for the Royal Veterinary College; but if this is not the case, are they of any value at all amongst us?

An answer to these questions will greatly oblige and satisfy many of your readers.

I am, gentlemen, yours very truly,

William Alleyne Cox, M.R.C.V.S.

Dublin; *June 11th*, 1874.

To the Editors of the 'Veterinarian.'

The College regulations provide for the entrance of students, without passing the matriculation examination, who can produce a certificate of having passed within the last four years an examination recognised by the General Medical Council as exempting candidates from the preliminary literary examinations of the various medical corporations.

Considering, however, the short period of study and the division of the course to meet the new system of examination for diploma, the College has not thought that any part of the curriculum could be dispensed with, even by one who had attended lectures on medical subjects five years ago.—[Eds.]

THE

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Communications and Cases.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from p.* 485.)

The Selenal Alliance, which will now claim our attention, is remarkable for the fewness of its natural orders and the multitude of its genera and species. It is also worthy of note that, as a rule, the plants of all the orders are innocuous, many of them enough so to be useful as food, whilst their highest medicinal use may be said to be that of palliatives in the form of emollient cataplasms.

Diagnosis.—*Hypogynous exogens, with monodichalmydeous flowers, a free central placenta, an external embryo curved round a little mealy albumen, and more than one carpel completely combined into a compound fruit.*

Professor Lindley further says of the Alliance: "At this point a considerable advance in structure is evident among exogens. Among these plants a corolla appears with all its fragrance and gaudy colours, and the ovary is constituted, not by the rolling up of a solitary carpellary leaf, but by the complete consolidation of several. The combining process is indeed carried occasionally so far among these plants as to divide the cavity of the ovary into distinct cells; but it is certain that the placentation is in all cases strictly central, no power being possessed by the carpellary leaves of generating ovules on their margin or sides." In order to examine the curious compounded capsule it will be well to

procure some of the ripened fruits of that common hedge-plant, the *Lychnis dioica*, which will be found in every hedge, though the capsule of a garden pink will do equally well.

The NATURAL ORDERS of SELENALS are as follow:

1. CARYOPHYLLACEÆ—CLOVEWORTS.—*Calyx and corolla usually distinct and symmetrical in parts of four or five. Leaves opposite without stipules.*

2. ILLECEBRACEÆ — KNOTWORTS. — *Calyx and corolla usually both present, symmetrical, the latter rudimentary. Leaves with stipules.*

3. PORTULACACEÆ—PURSLANES.—*Calyx and corolla both present and unsymmetrical. Leaves alternate, succulent, without stipules.*

4. POLYGONACEÆ—BUCKWHEATS.—*Calyx only present, but often coloured; nut usually triangular.*

The *Caryophyllaceæ*, or *Cloveworts*, is by far the largest natural order, as it consists of fifty-three genera, including no less than 1055 ascertained species. The variable nature of the plants of the order, in as far as the more trivial characteristics are concerned, may be judged from the fact that the insignificant chickweed and the stately pinks, picotees, and carnations of the garden are both notable examples, and a slight examination and comparison of the details of chickweed or stitchwort and pink or lychnis may show how natural indeed is the order which contains them all. Our native Flora contains eleven genera and over fifty species, to some of which we must refer as an illustration of the order. Our commoner species are described under the following heads:

a. *Stellaria*—Chickweeds, Stitchworts.
b. *Cerastium*—Mouse-ear chickweeds.
c. *Arenarea*—Sandworts.
d. *Spergula*—Spurrey.
e. *Githago*—Corn cockle.
f. *Lychnis*—Campion.
g. *Silene*—Catchfly.
h. *Saponaria*—Soapwort.
i. *Dianthus*—Pinks.

a, *b*, and *c* of these are found everywhere; they have most of them white flowers, the bright deeply divided corollas of many of them having that stellar appearance which have got the common name of starworts for some of the species. Chickweed is well known as food for birds, and there is reason to think that many of our small birds live almost entirely upon their seeds, and it would seem that these are

indeed cared for, as these plants produce from two to four crops of seed yearly. If, then, these creatures are so sedulously kept from gardens and well-cultivated districts, there is no wonder at the quick increase of chickweed. The sandworts, as their name implies, are lovers of sandy places, so that some of them are found on the sandy seashores, whilst our own sandy soils, especially under fine pulverising and constant cultivation, soon get too much covered with sandworts, chickweeds, mouse-ear, and the like. They are best got rid of by the constant use of the hoe, but it should be set to work early in spring, before a first batch of seeds be produced.

As regards the uses of chickweed, Mrs. Lankester says: "When boiled it forms an excellent green vegetable resembling spinach in flavour, and is very wholesome, growing as it does at all seasons, and very rapidly; it might well supply a want sometimes severely felt amongst the poor, of a variety of vegetable food. But so great are the prejudices against any innovations in diet that the most valuable articles of food are thrown away and destroyed as useless by those to whom they might be of the utmost benefit." Now, we have never eaten chickweed, and feel sure that if we were to recommend a trial to any of our poor neighbours the answer would be, "We never have tried it," and as this is said in a manner which implies "We never will," we hope to act differently, and soon to taste a dish of chickweed, as we are as fully convinced, as the author just quoted, that a want of knowledge and its consequent prejudices deprives both rich and poor not merely of necessaries, but of many luxuries.

d. The *Spergula arvensis*—Corn spurrey—is a very common weed in sandy soils, so much so that in parts of our farm situate on the oolite sands it completely smothers out anything until it is hoed out; thus young turnips and carrots have but a poor chance, as the spurrey comes up so quickly that the crop plants can scarcely be discovered; this adds greatly to the expense of cultivation. The spurrey is, however, by some, highly recommended for sheep feed, and therefore we hope to get rid of it by cultivating it. To this end it will be well to procure some foreign seed—the result of cultivation,—as its plants will be much larger. This sown thinly in fairly prepared soil, and thoroughly depastured with sheep before its seed had much ripened, would tend to the destruction of the native sort that might come up with the fresh, but if a little of the fresh did seed this would drive out the natives. This is a good way of culti-

vating weeds off the face of the earth, where their products are of any use, as experience daily teaches us that "ill weeds grow apace," but the moment you want to civilise them and make crop plants of them that they are very shy of growing.

e. The *Agrostemma githago*—Corn cockle—is well known to the farmer as furnishing an angular black seed. Much of this seed in wheat and barley is injurious to the sample, but it fortunately happens that it is perfectly innocuous. It curiously happens that as the cockle is so common on the chalks, farmers in buying seed barley mostly look out for a little cockle in the samples as an evidence of its chalk origin, as a change of seed from one geological formation to another is a matter of great importance.

f. Lychnis.—This is a showy genus, as the flowers are bright and conspicuous, and generally of various shades of pink. The plants, too, have a symmetric form of growth, which has caused many of the handsomest species to be much employed as garden ornaments. The Ragged Robin—*L. flos-cuculi*—we have known to be used by poor people in Gloucestershire as a remedy for scrofula. The formula being "a handful each of elder tops and ragged robin stampt together, then squeeze out the juice and take a wineglassful twice a day." The chickweed, too, has a reputation as a poultice to scrofulous sores. Probably in the first case juices of any innocent kinds of vegetables may act as an alterative, while the moisture and mucilage of such plants may be beneficial as emollients.

g. The *Silene Anglica* is not uncommon to sandy fields. We recollect a curious instance of its occurrence on a farm in Wiltshire. The fields were mainly situate on an eminence the very apex of which was formed of the sands of the Kelloway rock. On this sand was found the plant in question, though we doubt if other examples could be found within a circle of twenty miles from this spot. It is, however, an occasional agrarian weed, probably introduced with Continental seeds.

h. Saponaria officinalis—the soapwort—is commonly found in old gardens or in waste places about towns and villages, as it was formerly much employed in same manner as soap, from which, indeed, its common name is derived. We find the following note upon it in the new edition of 'English Botany:' "When boiled or bruised in water the leaves of this plant become saponaceous, and were used in ancient times as a substitute for soap; especially, it is said, by the mendicant friars. The lather so formed has all the effects of

soap, and readily removes grease. Not being affected by acids it might be usefully employed when the water is hard. The decoction has been employed both in France and Germany as an external application to the itch. It has also been given internally in gout, rheumatism, and some other disorders. Boerhaave recommended it for jaundice, but there is no proof of its efficacy. It contains a peculiar principle called saponine, which is white, amorphous, and has a taste first sweet, then styptic, and finally acrid (Gregory). It is a powerful sternutatory, and is soluble in water. The solution froths, when agitated, like soap. When acted upon by alkalis, saponine is converted into saponic acid. The detergent properties of this plant appear to depend upon this substance."

i. Dianthus.—Of this genus we have six native species, some of which are exceedingly rare; such is the "cheddar pink." The term pink applied to them is significant of the beauty and perfume of so many of the species. Thus Shakespeare speaks of the "very *pink* of courtesy," and we commonly use the expression the "pink of perfection."

The double pinks of our garden have probably been derived from the *Dianthus deltoides*, the maiden pink, and doubtless this latter name is only a tribute to its beauty and grace.

The clove pink, or wild carnation—*D. caryophyllus*—is in the same way the parent of the garden carnations in all their variations of form, colour, markings, and perfume. Mrs. Lankester says that "at the beginning of the eighteenth century there were four hundred varieties in cultivation, and we scarcely think they have diminished." There is not, however, the same rage in this country for carnations and picotees as once prevailed, still it is by no means a neglected plant.

The clove pink was formerly esteemed as possessing valuable medicinal properties, but even in "Old Gerarde's" time these were not thought much of, as he says: "These are not used in physicke, but esteemed for their use in garlands and nosegaies; they are good to be put into vinegar, to give it a pleasant taste and gallant colour."

In the natural order, then, just described we have had to review plants of great beauty, but it must be confessed that they are more remarkable for lack, rather than presence of, medicinal virtues.

PARTURIENT APOPLEXY (?) IN A MARE.

By John Gerrard, M.R.C.V.S., Market Deeping, Lincolnshire.

I take the liberty of recording a case of this disease which occurred here a few weeks ago, as it is somewhat unusual in this class of patients, and as it may tend to throw some light on the same affection in the cow, in which the pathology seems rather obscure and the treatment consequently unsatisfactory. Very few diseases are more tantalising or less satisfactory to the practitioner or the public. There are few diseases affecting the cow which seem more abstruse, and there are few in any class of our patients that for quickness of seizure and rapidity of termination can equal it, unless we except the hæmatoseptic diseases of young stock. Hence the importance of having or trying to have correct notions of its nature, for on this, I think, depends our ability to treat it successfully or instruct our clients in means of prevention, and in no class of cases are preventive measures so likely to be successfully applied.

The veterinary surgeon is, or should be, the conservator of the health of domesticated animals, and if he only aims at receiving a fee for medicine and attendance on actual cases of disease he, in my opinion, falls short of his legitimate function and duty to the public, to whom he is responsible for the opinions he propagates.

I make these remarks in no dictatorial spirit, but from the fact that some members of the Royal College of Veterinary Surgeons in this district hold the opinion that this affection in the cow is nothing more than debility, consequent on the secretion of milk at the period of parturition, and do a deal of harm in consequence by recommending that cows should not be milked for some time after calving. It seems a plausible explanation of such a protean malady, and is readily believed and acted upon by an ignorant country peasantry, who generally carry out the instructions to the letter, greatly to their own and the animal's detriment. Every cow which does not fall is regarded as saved by this practice, and the loss of a quarter, or even half or whole bag, is nothing in respect to the loss of a cow. Only a few weeks ago a client of mine was visited by his brother, who was a disciple of this doctrine, and who suceeded in persuading him that his cow, which had just calved, should not

be milked for a day or two, for fear, as he expressed it, "of throwing her down," as his veterinary surgeon had told him that was the cause of the disease.

The cow a very valuable one, and a heavy milker, was allowed to go unmilked for nearly two days, and on the third day she seemed so uneasy as to induce the owner to ask me to see her.

The udder, an extremely large one under ordinary circumstances, was extremely swollen and inflamed, the surrounding effusion extending from the sternum to the vulva. The cow was feverish and very uneasy, but continued to eat moderately. Little milk could be got away, and neither bathing, rubbing, nor poulticing, nor internal remedies, relieve or subdue the irritation of the system. She died on the sixth day after calving, with considerable suffering. I may mention that the effects of the non-elimination of the milk from the system fell upon the liver, which was highly inflamed and enlarged.

Now, if a poor illiterate jobber be fined for what is called "hefting," surely the Society for the Prevention of Cruelty to Animals would have a good case against members of a learned profession ordering or sanctioning such cruel and unscientific practices. But I am, perhaps, condemning them before being tried, and if this should meet their eye they may, perhaps, be good enough to explain their theory and give us the results of their practice.

On the 23rd April last I was requested by Mr. Thomas Arden, Baston Hall, to examine the carcase of a mare that had died suddenly when endeavouring to foal.

She had gone two weeks past her time, and had shown but few symptoms of a near approach of parturition. She had also been regularly worked up to the day before the occurrence. On the morning of that day she had been left at home in consequence of the illness of the man who worked her. She was left in the stable alone when the rest went to work, and showed no symptoms of parturition, or anything unusual. She was seen at 12 o'clock in the same condition, and at 2 o'clock was found dead, with no appearance of a struggle; a slight discharge from the vulva indicated the commencement of parturition.

No lesion was found either in the abdominal, thoracic, or pelvic cavities to account for death, and with the exception of slight congestion of the lungs all the organs were healthy. The stomach contained a moderate quantity of well-masticated food; the lymphatics and mesenteric glands were engorged with chyle, affording evidence that the assimilative functions

had been in proper condition at the time of death. The cavities of the heart were all distended with healthy blood, which coagulated on exposure, showing the mode of death to have been *asthenic*.

The fœtus was large and well developed; the head was bent down on the sternum, the fore feet extending below the brim of the pelvis, the poll only presenting. The membranes were intact and in a healthy condition. On disarticulating the head between the occiput and atlas a large quantity of bloody serosity escaped, and on the floor of the cranial cavity a number of blood-clots were observable, probably from rupture of the membranes during the removal of the brain. It was evident a rupture of some of the vessels in the cranial cavity had taken place, but I was unable to detect the lesion. The membrane and vessels had a gritty feel, and numerous granules and scaly patches were observable. Effusion into the ventricles of bloody serum was extensive, and in the fourth ventricle, or ventricle of the cerebellum, a small clot was found, but no serum, which in all probability had escaped when the head was removed from the body.

On inquiry I found that the mare had been subject to giddiness and fits of staggering, when made to pull hard, for some three weeks previously, but no notice was taken of it, as she had never fallen altogether, and the symptoms always wore off after a few minutes' quiet. She was about twelve years of age, and this was her seventh foal.

I considered it a case of apoplexy, and have reported it accordingly.

Two other cases of a similar nature occurred here—one this season, and the other last year—but in them the parturition process was completed before death, as the foals in both cases stood behind the dead body of their parents. In neither of them had I an opportunity of examining the carcase, but, from what I could learn concerning these cases, I am now inclined to believe them to have been apoplectic.

The question naturally arises, does the case named herein bear any analogy to parturient apoplexy in the cow?

I am of opinion it does not, at least in its essential nature. Death, undoubtedly, was the result of the parturient throes exciting the action of the heart and exerting muscular pressure on the arteries leading to the brain, producing rupture of some of the meningeal or cerebellar arteries, already weakened by calcareous degeneration.

No such appearances are found in the cow; the disorder in her is not so extremely sudden, and is always attended

with symptoms of disordered nerve centres other than those of the brain, although the brain ultimately becomes involved. It seems to be one of the peculiarities of this affection that no well-marked lesion is observable in any of the nerve centres, at least to the unaided eye.

What, then, is the pathology of this affection, and why is the cow so subject to it?

The most recent attempt to answer the latter question has been made by Professor Walley, who says that the disease is owing to the peculiar arrangement of the blood-vessels supplying the brain, having an "easier method of ingress," "the shorter neck," "and greater volume of the internal organs of the cow," as compared with others of our domestic animals.

If this were the correct explanation I think we should find the worst cases after very difficult labours, especially in young heifers, which generally have strong pains and often require assistance, assuming always that the peculiar arterial arrangement described by the professor is constant in the brain of the ox tribe.

In practice, however, we find the very opposite to be the case. It is a universally admitted fact that the attack occurs oftenest after very easy labours; indeed, I have never known a case after a very difficult one, nor do *post-mortem* appearances bear out the hypothesis, for there is almost an entire absence of any well-marked lesion either in the brain or spinal cord.

If this theory be correct, what becomes of the "Monro and Reid" theory which the professor adopts as the basis of his reasoning on the subject, a theory which maintains that "the amount of fluids within the cranium must always be the same so long as its osseous walls are capable of resisting the pressure of the atmosphere."

The cow, of all other animals, is destined to afford the largest amount of that wholesome and nutritious beverage milk. A constant supply of this fluid is a considerable demand upon the constitution in certain states, only in some of which it is yielded largely; these are in an unimpregnated condition of uterus and during the earlier months of utero-gestation.

Fully to provide for fœtal growth there is, in mammalia, during gestation, a greatly increased, and the nearer parturition a rapidly increasing, development of the vascular system in the parent; but, perhaps, in no animal does this correspond in extent with that of the cow, which may be accounted for by the fact that Providence has destined her, not only

amply to provide support to her offspring, but also to contribute largely towards that of mankind. Hence her peculiar liability to various diseases, both in a puerperal and barren state, arising from the existence of a larger quantity of blood in the system than is immediately necessary for growth and nutrition.

In making these remarks my intention is to render obvious that, shortly previous to and at the time of parturition, there is, from the requirement of increased activity, both in the animal and organic functions, an increased stimulus or action required to be exercised by the nervous centres effectually to promote their performance.

It has been ascertained by Dr. R. Lee, of London, that, after conception, not nerves only, but considerable ganglia, previously not perceived to exist, are apparent in the vicinity of the uterus.

Such stimuli, of a nature and duration unknown on any other occasion, must, therefore, be favorable to a development of disease, by rendering the nervous system susceptible of impressions which under other circumstances might not have operated thereon.

This extremely vascular state of system is, in ordinary cases, relieved by a plentiful secretion of milk, which nature, as it were, providing against consequences, excites the udder to secrete some time prior to parturition. In other cases it is different, and we are all perfectly aware of the physiological truth that any organ ceasing to perform its usual actions in the animal frame cannot suddenly resume them; in fact, we know that if such be suspended for any undue time they are incapable of being again re-exercised.

Although this may apply less to the udder than to any other organ of the body, still it must be confessed at times to fall within the general application of this principle, and not after all cases of parturition to regain its former activity.

Parturition, by separating the fœtus and its membranes from the maternal uterus, involves a sudden and complete check to the current of blood recently required by them in utero; the fœtus being now provided with means of sustaining an independent life, dependent, nevertheless, still upon its parent for food, namely, milk, and that milk secreted from the circulating fluid, previously imparting nutrition in another form and through another channel.

Should, then, any constitutional or other cause interfere, so as to prevent a secretion of milk in full proportion to an existence of its elements in the system, or this effect be pro-

duced by any tardiness of the udder in resuming its functions, we can easily conceive that, under such circumstances, some organ or class of organs, previously wrought upon by an unusual stimulus, would, from the consequent predisposition thereto, assume a diseased action.

Thus, I infer, arises one great, if not the greatest, cause inducing puerperal fever, and that the nervous centres are at this time more than any other susceptible of morbid impressions, we have, in my opinion, from these collateral considerations, a right to infer.

It will, then, be evident that cows yielding large quantities of milk, and kept on stimulating food before calving, must be extremely liable to this disease. Of this we have daily evidence in its frequent occurrence among farmers or dairy-keepers, whose interest or pride it is to create as much milk as stimulating food will produce, and of its comparatively rare occurrence among others, who habitually, either from neglect or poverty, keep their cows lean. It is, indeed, proverbial in some districts that fat cows, if good milkers, are pretty certain to fall of "milk fever," a name among professional men now in disuse, but one, like many others, arising from observation, and certainly more proper than the one we adopt.

A fat state of body alone is by many considered a cause of this disease, showing, as it does, the materials and processes of assimilation to counterbalance the expenditure of vital power—a state certainly favorable to disease of various kinds.

I have, however, uniformly observed that here puerperal fever, in the character we are now considering it, seldom makes its appearance unless the vascular and consequently the lacteal systems are fully developed—a state not always in unison with the former.

In no one instance do I remember to have seen the disease occur in a bad milker, however fat, as in these comparatively non-vascular constitutions there is not a sufficient quantity of blood to operate injuriously if thrown back upon the constitution.

It is also worthy of remark, as tending still further to confirm this view, that such description of cows have uniformly small calves, while those of an opposite constitution, although lean, have generally large ones.

Another very good confirmation of the view is found in the circumstances recently related to me by Mr. Robert Learson, Cranmore Lodge, who bred for thirty years pretty extensively pure short-horn stock. They were of good blood, and, as is

usual, very fat, calving at all seasons and ages, and under circumstances usually considered favorable for the production of apoplexy. Strange to say, however, he never had a case during that period; but about two years ago he sold off his pure stock, and introduced an inferior kind. In the end of last year he purchased some eight drape cows; they were fed in the yards with cake and mangolds until April, when they were turned out to be fed off. One of them turned out in calf. Little notice was taken of her; she was allowed to remain in the field until, one day showing symptoms of uneasiness, she was removed to the steading, when she gave birth to a calf shortly after, but unnoticed by any one. Four hours after being placed in the box she was found staggering round it, barely able to maintain a standing position, and almost fell upon the calf when they tried to remove it. Six hours more elapsed before I saw her, when she was almost comatose, and, as she was in high condition and full of blood, I thought it better to consign her to the butcher. This was the first case that had occurred on the farm for thirty years; but previous to that, and before he kept breeding stock, he often had cases. This cow, in all probability, had been sold for fear of a recurrence of the disease, it being known that a second attack is almost always fatal.

The disease never follows abortion, which we can easily account for on the ground of its non-appearance in bad milkers.

There is a pretty certain preventive in milking the cow some time before calving, in full bloodletting before or immediately after, in purgatives, very limited diet, and in other depletive measures, each and all tending to illustrate the necessity of a vascular state of system for its development.

The predisposing causes, then, we may consider to be the existence of a larger quantity of circulating fluid in the system at the time of parturition, produced constitutionally or artificially, than is required for the animal and organic functions.

An excitability of nervous system induced by gestation and parturition unknown at any other time.

Anything indirectly preventing a full secretion of milk, or this directly produced by inability, inactivity, or want of tone in the udder itself to resume its functions, thus causing a want of lacteal secretion in proportion to an existence of its elements in the system.

The adult or full state of growth, with considerable development of the vascular system and plethora.

And that its essential nature consists of congestion of the nervous centres, and, in many cases, of speedy effusion into its tissue, causing, by complete disorganization thereof, a consequent inability to perform or preserve its functions in the animal frame.

Such are the opinions and cogitations on the subject of a worthy man and talented teacher of the science, viz. the late Professor John Barlow.

Thirty-five years have well-nigh elapsed since they were enunciated, and, notwithstanding the advances in physiology and pathology since then, they have not, *in my opinion*, been set aside.

Cogitations and opinions which show a comprehensive and correct grasp of the subject, and such as, if better known and more generally acted upon, would undoubtedly save many a valuable life, and certainly prevent the repetition of such unscientific practices as I have endeavoured to expose.

That they may produce such results is my motive, and must be my apology for obtruding them upon your readers.

HYDROPS PERICARDII IN A COW.

By John Malcolm, M.R.C.V.S., Enniscorthy,
Co. Wexford, Ireland.

Gentlemen,—On the 11th of June I was called to see a cow, the property of F. Sutton, Esq., St. Ann's, near Enniscorthy. On my arrival the animal exhibited the following symptoms:—Pulse 120, weak and intermittent. On applying pressure to the intercostal spaces she evinced great pain, more especially on the left side; on auscultation I could distinctly hear a crepitating sound, and on percussion a dull one; the cow was hidebound, with coat staring, and there were slight symptoms of intestinal irritation.

I administered

℞ Olei Lini, Oj;
Spt. Æth. Nit., ℥iss;
Tr. Opii, ℥iss;

and applied the following ointment to her chest:

℞ Hydrarg. Biniodidi, ʒj;
Adeps, ℥j.

I also gave a little Tr. Aconiti and water several times a day.

12th.—Little alteration in symptoms. Gave another antispasmodic mixture, applied more ointment to the chest, and left the following powders:

℞ Camphoræ, ʒss;
Pot. Nit., ʒij;
Pot. Tart., ʒss;
Gentianæ, ʒij;
Zingiberi, ʒj.

One to be given three times a day in a little gruel.

13th.—Symptoms much the same; on auscultation, the crepitus was not so distinct; but the sound was very dull on percussion.

14th, 15th, 16th.—Little alteration in symptoms.

17th.—No crepitating sound, but dulness on percussion more marked. Appetite improved; eyes more bright; mouth cool; dew on the nose; notwithstanding this apparent improvement it was evident that the cow was not progressing favorably.

℞ Gentianæ, ʒij;
Zingiberi, ʒj;
Pot. Nit., ʒij.

One to be given three times a day in a bottle of ale or porter.

The cow continued much the same until the 23rd, when she evinced slight pain. I gave her a little ether and opium, which had the desired effect, and continued to visit her up to the 30th, when I found her lying on her breast and chewing her cud. The pulse could scarce be felt, was very weak and intermittent, and about 130.

Her diet consisted of a little gruel, bran, mangel-wurzel, grass, and a bucket of cold water left constantly with her and changed several times a day. She was kept in a very quiet, comfortable loose box all the time.

On July 2nd the cow was found dead, and from appearances she must have died without a struggle.

Post-mortem examination.—On making a longitudinal incision through the sternum and abdominal muscles I found the thoracic and abdominal cavities to contain about fifteen gallons of serum. There was also effusion of serum more or less into the cellular tissue all over the body, especially under the pectoral muscles, at the anterior part of the chest and neck; the subcutaneous tissues were about four inches thick from exudation of lymph. The next sight which

presented itself to my view was the pericardial sac; and not having seen so bad a case before, I thought at first sight there was rupture of the diaphragm and protrusion of the stomach into the chest; so large was it that it occupied almost all the inferior part of the chest. Indeed, I could scarcely see any portion of the lungs.

On cutting into the sac I found it contained several quarts of thick straw-coloured serum mixed with lymph. I made no further examination of the heart, but thought, as so bad a case was rare, I would send it over to the College for examination.

I learned the following history of the cow from the steward:

She was bred by the owner, Mr. Sutton, and had produced two healthy calves, one in 1873, the second on the 9th of May, 1874, both of which are in perfect health. After her first calf she showed symptoms of decline, became very much reduced in condition, was always more or less hidebound, and drawn up in the flank. She often refused her food, and was seldom seen chewing her cud. For several months before sending for me they had given some salts, which may account for the intestinal irritation.

SUBACUTE PARAPLEGIA IN THE HORSE, AND THE USE OF STRYCHNIA IN ITS TREATMENT.

By W. E. Litt, M.R.C.V.S., Shrewsbury.

It has always struck me as being singular that one rarely sees in the horse any other form of idiopathic paralysis than that which affects the hinder extremities. Another singularity exists also with respect to paralysis in the horse as distinguished from the same disease in man. It is this, whereas in the latter it is usually late in life that the attack sets in, in the former it is generally seen in animals under five years old, usually, indeed, in two- and three-year-old colts. I am quite unable to account for these differences, or, indeed, to offer any hypothesis on the subject, beyond the simple idea that it may in some way be owing to the differences of habit, living, &c., of the two subjects. Idiopathic paraplegia appears to be due, according to Gamgee, to red softening of the spinal cord, the result of congestion and inflammation, and has been called by some writers "myelitis." The disease may be acute, attacking the patient without the

slightest warning, or it may be gradual in its approach, and in the first instance merely produce a slight interference with the action of the hinder limbs. A few observations which I have noted down with regard to some of the latter cases which may be called chronic, and which have come under my notice within the last twelve months, may prove interesting.

Case 1 was a brown, three-year-old colt, about three parts bred, and in capital condition. It was first seen by me on the 18th of July, 1873. The symptoms presented were want of muscular power in the hinder extremities, and consequent interference with locomotion. Sensation was perfect everywhere. The colt was apparently in perfect bodily health; he lay down regularly, and got up with but little difficulty. He could walk, and there was not much peculiarity in his action at this pace, merely a little swaying from side to side, and a certain amount of stiffness of the limbs generally, but most noticeable in the hocks, which were but slightly flexed when in action. When urged to trot, however, the poor animal staggered about a good deal, and would have fallen but for timely assistance. I was informed by the owner that he had noticed a peculiarity in the colt's action for nearly a month past, but that latterly he had become much worse. I ordered him to be put into a roomy loose box, which was littered with short straw, and directed him to be fed on mashes and grass. I also prescribed for him the following powders:

℞ Strychniæ, gr. vj;
P. Gent. Rad., ʒiss;
P. Farinæ, ʒivss.
M. et divide in xij.

One to be given night and morning in bran mash. At the expiration of a week the strychnia was increased to nine grains in the twelve powders. During the third week the powders contained each one grain, and the following week the dose was farther increased to one and a half grain in each powder, one of which was also given twice a day. In the fifth week the dose was reduced to three fourths of a grain, and in the sixth and seventh to half a grain, still given twice a day. The medicine was now discontinued and the patient discharged cured. For the first fortnight little change was noticeable, but about the third week there was a marked improvement in the action, and at the end of the fourth week, when the dose of strychnia was three grains per diem, there was so little to be seen the matter with the colt that I had some difficulty in persuading the owner that it was necessary to continue the medicine. This,

however, was done, as I have before stated, but the doses were gradually decreased to the original half grain twice a day. The action in this case was completely restored, and the recovery therefore perfect.

Case 2 was a very fine waggon colt, two years old, and, like the previous case, in good condition. The paralytic symptoms were, however, much more marked. Indeed, my attention was only called to the animal's condition when it had been suffering for some two or three months, the owner having turned the colt out, thinking, as he said, "that he would grow out of it." He did not, however, grow out of it, but rather grew into it still further, and his state was then such as to lead me to consider his chance of ultimate recovery decidedly problematical. I first commenced to give strychnia on December 20th, 1873, in the same form of powder as that administered to Case 1.

The following is a table showing the quantity given in each dozen powders:

1*st doz.*	2*nd doz.*	3*rd doz.*	4*th doz.*	5*th doz.*
gr. vj.	gr. xij.	gr. xxiv.	gr. xij.	gr. xxiv.
6*th doz.*	7*th doz.*	8*th doz.*	9*th doz.*	10*th doz.*
gr. xxxvj.	gr. xlviij.	ʒj.	ʒj.	ʒj.
11*th doz.*	12*th doz.*	13*th doz.*	14*th doz.*	15*th doz.*
ʒj, gr. xij.	ʒiss.	ʒj.	ʒj.	ʒj.

The paralytic symptoms being now very much ameliorated, the medicine was discontinued. The colt had been put to work, and did so freely for some weeks, nothing being observable excepting a slight stiffness in his gait and some little difficulty in "backing." After an interval of something like six weeks, however, the paralytic symptoms began to return, and it was found necessary to continue the administration of the drug. This has been done, the doses being up to the present time as follows:

1*st doz.*	2*nd doz.*	3*rd doz.*	4*th doz.*
℈ij.	ʒj.	ʒj, gr. xij.	ʒiss.

This case is, therefore, still under treatment, and I shall not fail to record the result. It will be noticed that at one time the colt was having fifteen grains per diem, and at this time the physiological effects of strychnia were occasionally noticeable in the shape of spasmodic but irregular muscular twitchings, and when these became violent the dose was reduced by giving only half a powder night and morning for once or twice.

Strychnia is described as a non-cumulative drug; but the physiological effects, as produced in this case after a continuance of the larger dose, being relieved by the use of a smaller one, and the patient being able to again stand the larger dose for three or four days without any unpleasant symptoms, would tend rather to the opposite idea.

Case 3 was a well-bred three-year-old colt. I first saw this on May 25th last. It appeared from the owner's description that a few days previously he had found the colt in the field in much the same condition as when I saw him. His symptoms were precisely the same as those exhibited by the other two cases, viz. a slightly staggering gait whilst walking, and an inability to trot without great danger of falling. Here also there was no want of sensibility, and the animal could lie down and rise without difficulty. I had the patient removed to a loose box, and ordered him to be kept on vetches (of which the owner had a plentiful supply) and bran mashes. A blister was applied to the course of the spine, and strychnia given in the following doses:

1st doz.	*2nd doz.*	*3rd doz.*	*4th doz.*	*5th doz.*
gr. xij.	gr. xxiv.	ʒss.	℈ij.	gr. j.

Up to this time there was a gradual but decided improvement in the condition of the patient. On the morning of the 29th of June, however, I was sent for in a hurry, the messenger saying that the colt was down and could not rise. On my arrival I found this to be the case. There was all but total loss of motion in the hinder extremities, and sensibility was very considerably impaired from about the last dorsal vertebra backwards, the most sensitive part being the tail. The breathing was very much quickened, and the animal was sweating profusely. The pulse was about 70, and wiry, and the temperature 102°. The urine and dung were voided involuntarily. The colt was very uneasy, constantly lifting his head and trying to get up. There was no tetanic spasm or muscular twitching of any kind. I was informed that the colt appeared in his usual health, and perfectly hearty, up to that morning; he had, just before he dropped, eaten his morning feed (which contained a powder), and was quite playful. He had been decidedly improving in his action for the previous fortnight, and I need not say that his owner was much surprised at finding him in the condition he did so soon afterwards.

I had him propped up with litter and made as comfortable as possible. From being so hurriedly sent for I was under the impression that the patient was suffering from an over-

dose of strychnia, but finding this not to be the case, and considering his condition to be hopeless, I decided, for the sake of experiment, to give some large doses of strychnia. I accordingly administered to him myself, in gruel, eight grains, and directed the same quantity to be given every six hours, promising to see him on the following morning.

I found him in much the same condition, excepting that he was quieter and had eaten some green vetches. He had, however, by this time knocked himself about a good deal, and his owner decided to have him destroyed, as it was evident there was no chance of his recovery.

It is singular in this case that, notwithstanding the immense dose of strychnia which had been administered—twenty-four grains in eighteen hours—no effect, however transient, was produced.

It will be seen that this case differs very much from the other two in the fact of its suddenly becoming acute, a circumstance which is quite unique in my experience, though it is common enough to see cases in which the paralysis has been sudden and acute in animals which had previously exhibited no symptoms of stiffness even. Indeed, in the majority of cases which have come under my notice they have been colts at grass, and have been found down and helpless in the field. These cases are, I believe, invariably fatal.

LEAD-POISONING (BELLAND).

By W. A. Cox, M.R.C.V.S., Dublin.

In the beautiful and picturesque part of Derbyshire known as the "Peak," an endemic disease of a peculiar nature is very prevalent; this district is particularly rich in minerals, especially lead.

Owing to a custom of the county miners are allowed to open workings upon *any* land on paying certain fees or royalties; hence numerous mines are opened and worked by a few private individuals, who avail themselves only of the richest ore, throwing the refuse in heaps around the mouth of the shaft. These accumulations, which contain much ore, are rarely if ever protected, and as they abound on grass lands they are carried over the surface of the surrounding

pastures by the feet of animals and by the washing of the rain, and taken with the herbage into the stomach of the animals grazing on the land. This poisoned food affects all species, but has a more frequent fatal termination amongst the ruminantia. The disease has received the local name of "belland," the origin or definition of which I cannot explain.

The refuse in the heaps contains lead in the form of native sulphide or galena, this becomes oxidised by the action of the air, or there may be carbonate of the metal mixed with it. The agent acts as a prison, either mechanically or chemically, giving rise to two distinct forms of disease. The *chronic form*, which is commonest, and is the result of mechanical interference, manifests itself in cattle by a staring coat and a stiff gait; the extremities and skin are of a proper temperature; the pulse is sluggish; the evacuations are apparently natural; there is no perceptible constipation, or even torpor; there is a slight and gradual decrease in the quantity of milk, *but no appearance of serious illness*. After a few weeks, and in some cases even months, the breathing is perceived to be quicker, the animal grunts, especially when walked down hill; the digestive system is occasionally slightly deranged, but tympanitis is not invariably present; the coat becomes ragged and staring, and there is a great waste of muscular tissue, a reeling staggering gait, especially of the hind extremities, and when down a difficulty in rising, a fixed vacant expression of countenance, with grinding of the teeth, and muscular twitchings.

The mucous membrane of the mouth is of a blue purple colour, but the *leaden* blue is not specially apparent round the gums. These symptoms become slowly aggravated; delirium and convulsions ensue, and result in death.

In sheep the symptoms are similar to those detailed above. In horses the skin is staring and "bound," and the respiration so much increased that it is not uncommon to hear it said of a broken-winded horse, "Oh! he is bellanded." Until, however, this symptom has exhibited itself for some time no cough is present.

These are not isolated cases, but are of frequent occurrence, and the veterinary surgeon is rarely called in until too late to be of service.

The treatment should consist of doses of the sulphates acidulated with sulphuric acid, solutions of alum, &c. Stimulants may be applied to the poll and loins. Carminatives and tonics should be given during the convalescent stage.

In the *acute* form the disease runs its course very quickly, and the symptoms are very urgent; the animal elevates its nose or carries its head on one side, there is constant champing of the jaws, a very staring expression of countenance, blueness round the gums, the respiration is quickened, and the animal supports itself against anything with which it comes in contact; if disturbed, convulsions follow in quick succession, and the animal falls down and death quickly takes place.

The *post-mortem* appearances of the chronic form are, greyness of all the mucous membranes; the heart is flaccid, and the coagulum imperfectly formed. If the case has been protracted, the lungs are filled with small granules, the abdominal viscera are all more or less diseased, the kidneys partly disorganised, the liver shrunk and paler than natural. The contents of the rumen have occasionally small particles of mineral mingled with them.

In some horses dying from lead poisoning the lungs were found to be emphysematous; in others vomicæ were discovered and the vessels of the brain and spinal cord were filled with dark coloured blood. In the acute form vomicæ or tubercles were not seen, the lungs were emphysematous, there was a considerable quantity of air between the pleura and the lungs, and extravasation at the base of the brain was observed. It is probable that in the chronic form the animal repeatedly takes minute quantities of the poison in its most innocuous form, and that its action is therefore slow. Many of the morbid appearances are due either to increased effort on the part of the organism to throw off the poison, to the blood becoming loaded with morbid material, or to an impaired nervous action the direct result of the poison.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of June, 1874, have been found to be affected with any Contagious or Infectious

Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Antwerp .	London .	Foot-and-Mouth	4	...	...	...	4	4
Harlingen .	Hull . .	Pleuro-pneumonia . .	1	...	...	...	1	1
Hamburg .	London .	Foot-and-Mouth .	6	...	...	...	6	6
Oporto . .	Liverpool .	,,	9	...	...	...	9	9
,,	London .	,,	31	...	...	...	31	31
Rotterdam	,,	,,	...	...	...	405	405	405
Total . . .		Pleuro-pneumonia . .	1	...	...	...	1	1
,, . . .		Foot-and-Mouth .	50	...	...	405	455	455
Total			51	...	...	405	456	456

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 13th July, 1874."

CATTLE PLAGUE.

Latest advices state that this disease prevails in twelve different places in Poland, that it has broken out again in the south of Hungary, and continues in Croatia, Slavonia, and the military frontier.

Galicia is also the seat of the disease, as is Roumania, Carinthia, and the Island of Naxos. The malady has likewise reappeared in the neighbourhood of Odessa.

Besides this extensive existence of cattle plague, the malady is reported to have shown itself in some sixteen villages in the immediate neighbourhood of Jerusalem, and to have extended thence into the mountainous districts.

FOOT-AND-MOUTH DISEASE

This disease is stated to be very rife in the Regency of Tunis, in consequence of which the importation of cattle from Tunis into Italy is prohibited.

The disease continues to prevail in the neighbourhood of Lisbon.

SHEEP-POX.

This disease is very prevalent in Roumania, and has caused serious losses in the district of Barconetti; thirty per cent. of the animals affected are reported as having died from the effects of the disease. It also continues to manifest itself in many parts of the German Empire, especially in Pomerania.

Facts and Observations.

The Composition of the Bones of Animals Fed with Food containing varying proportions of Lime and Phosphoric Acid. By H. Weiske and E. Wildt ('Zeitschr. f. Biologie,' ix, 541—549).—A continuation of previous experiments of Weiske, and an extension of them to young animals. It is found that lambs fed on food deficient either in phosphoric acid or in lime, decrease in weight and become diseased. The bones of such animals weighed less than those of similar animals fed on food containing a proper proportion of earthy phosphates. The bones of the diseased animals had, nevertheless, a normal composition, and were deficient neither in phosphoric acid nor in lime.

The authors' previous papers may be advantageously consulted in connection with this subject (see *Chem. Soc. J.*, xxv, 897 and 1106).—*Journal of the Chemical Society.*

Coagulation of Albumen.—E. Mathieu and V. Urbian have found that when the serum of blood is completely freed from gas an albuminous liquid is obtained which does not coagulate even at 100° C. The authors show that carbonic acid is the agent which effects the coagulation of albumen under the influence of heat, and that 100 c.c. of egg albumen

contain from 65 to 86 c.c. of carbonic acid, from 2 c.c. to 2·86 c.c. of oxygen, and from 3 c.c. to 5 c.c. of nitrogen. Albumen deprived of gas, although it does not coagulate, behaves like normal albumen toward precipitants. It is further shown that albumen deprived of its volatile salts (sulphate and sulphide of ammonium, which exist to the amount of 2 grams of 100 c.c. of albumen) is converted into globulin, and that globulin, with the addition of a little carbonate of ammonia, takes on the characteristic properties of albumen.—*English Mechanic.*

Action of Sugar and Sulphuric Acid on some Alkaloids.—R. Schneider gives in *Comptes Rendus* the following brief synopsis of the action of sugar and sulphuric acid on some alkaloids : the solution of the alkaloid is mixed with six to eight parts of white sugar and one drop of concentrated pure sulphuric acid added. The reactions are as follows :—Morphine, purple, passing to violet, greenish-blue, and finally to yellow The changes are due to the absorption of water. Codeine, purple, passing to violet, then to brownish-yellow. Narcotine and narceine, brown coloration not characteristic. Quinine, brown coloration not appearing in presence of much water. The fluorescence is, however, much increased. Strychnine, brucine, atropine, colchicine and picrotoxine, give no characteristic coloration. Aconitine, at the point of contact a rose colour appears, passing to violet and then to brown. This reaction resembles that with codeine and morphine, but the different menstrua in which these three are soluble will serve to distinguish them. Delphinine, brown spot with dull green border, turns green on adding water.—*Ibid.*

Poisoning by the Giant Puff-ball.—The Giant Puff-bull (*Lycoperdon giganteum*), probably the best of the edible mushrooms, is just now "under a cloud." It appears that Mr. Sadler, while preparing a paper of fungi, to be read before the Pharmaceutical Society, accidentally swallowed a number of spores of this species, and within the space of ninety minutes was seized with violent pains and a sharp attack of illness, which did not yield till the ninth day, leaving the patient very weak. Sir R. Christison and Drs. Balfour and Craig, who attended Mr. Sadler, are of opinion that the irritation was kept up by the spores. The lesson to be learnt is to avoid the Giant Puff-ball when ripe ; but it may be freely partaken of while young and perfectly white.—*Ibid.*

THE VETERINARIAN, AUGUST 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

ON VENTILATION.

TIME was when veterinarians as well as the followers of the sister profession of human medicine merely treated the symptoms of disease, and paid but little or no attention to its causes and prevention. At the present day, however, both branches of the healing art are busily investigating the circumstances which give rise to morbid conditions of the animal economy, and instead of freely and blindly indulging in the administration of "vile mendicaments," more frequently treat their patients according to the more rational rules of hygiene and regimen.

Whether animals continue healthy or contract disease very often depends upon the kind and quality of food they eat, the water they drink, or the air they breathe; and that this statement is based upon fact, and not upon theory, is proved in reference to pure air by the following evidence. Rossignal, an eminent Parisian veterinary surgeon, tells us that the mortality among the horses of the French cavalry prior to the year 1836 amounted to 180 to 197 per thousand per annum, whereas during the succeeding ten years, that is, after the stables had been enlarged and the ration of air consequently increased, the death-rate fell to sixty-eight per thousand, and in some instances, where the ventilation was further increased, the diminution in the mortality was still greater.

Mr. Wilkinson, Principal Veterinary Surgeon to Her Majesty's Forces, states that the number of deaths among the English cavalry horses, which was formerly considerable, is now diminished by superior stable accommodation to twenty per thousand per annum, and of this, half arises from accidents and incurable diseases. The same authority also states that under the improved system glanders and farcy have almost entirely disappeared. To the testimony of these gentlemen we may add that of M. Moulin, who informs us that during the

Italian war 10,000 horses were kept in buildings externally open to the air, instead of in closed stables, and that scarcely any horses were sick, also that there occurred only one case of glanders.

Now, it must be borne in mind that the absence of vigour observed in animals dwelling in stables insufficiently supplied with fresh air, as well as disease arising from imperfect ventilation, are only in part due to the imperfect provision usually made for the escape of the narcotic carbonic acid and other products of respiration. Probably the chief mischief arises in badly arranged stables from the irritating ammonia yielded by decomposing urine, and the still more noxious, but at present less tangible, products of the putrefaction of fæcal and other organic matters.

The summer that we are now passing through is an exceptionally hot one, and as a high temperature is favorable to animal and vegetable decay, which too often results in the excitation of the atmospheric evils to which we have been adverting, we most strongly advise our readers to thoroughly study the principles of ventilation, and to make themselves acquainted with the best methods of carrying them out in practice. By pursuing this course we feel assured that they will in many instances successfully combat with diseases which will not succumb to ordinary medical treatment, and thereby they will render such valuable and manifest aid to their clients as must result in increased reputation and confidence.

The subject of ventilation is much too extensive to be dealt with in detail in a leading article. We would, therefore, recommend to our readers the perusal of Parkes' 'Practical Hygiene' and Fitzwygram's 'Horses and Stables.'

APPOINTMENT OF PORT INSPECTORS.

We have to announce that it is intended to appoint, between the present time and the end of the year, about twelve inspectors, and assistants to the present inspectors, at the ports where Irish cattle are landed. The salaries will vary from £100 to £200 a year.

Candidates are requested to send their names as early as possible to the Principal of the Royal Veterinary College, that arrangements may be made for their examination, it being probable that some of the appointments will be made immediately.

Extracts from British and Foreign Journals.

AUSTRALIAN MEAT.

It would be absurd to pretend that Australian meat is yet popular in the true sense of the word. Indeed, the popular instinct is decidedly against it. There are many reasons why this is and should be so. In the first place, two samples can never be depended on to turn out identical in flavour or quality. A great deal of it is so overcooked as to be tasteless, and the delicate portions, *e. g.* tongues, &c., are in price only within the reach of the rich.

Some of the "corned" beef is very palatable, but, owing to the demand, parts utterly unsuited for "corning" are used, and the pressing and flavouring are very imperfectly or hastily attended to. The abominable coarseness of many samples of meat is greatly answerable for the popular prejudice. Meat which cannot be cut evenly, but which will break up into strings, is not agreeable to look at, much less to taste.

Another and perhaps the strongest prejudice arises from the suspicion that "Australian meat" is often bred, fed, and killed nearer home. Undoubtedly, a trade has long been in existence for the manufacture of tinned meats, and a correspondent assures us that a large retail dealer told him that he was offered a parcel of plain tins at a low price, and the seller undertook to have them branded or labelled with the brand most in demand in his town.

We do not object to have flesh *per se*, but we object to it under any disguise. We certainly cannot be fairly indignant with the Chinese for their tea frauds, while we wink at the almost undisguised traffic connected with the knackers' yards, and send our tallow to Normandy and Brittany to be reimported as first-class butter.

As far as the horse-flesh question is concerned, traffic in it ought to be strictly prohibited. Sound horse-flesh, apart from sentiment, would be prejudicial to no person's health; but we know perfectly well that in no European country would it pay to kill horses for food. In health they are

worth so much more alive than dead, and we do not wish to have old or diseased animals set before us as food. It is curious that no knacker has yet been bold enough to tell what becomes of the horses' tongues!—*Sanitary Record.*

REPORT ON THE ORIGIN AND PROGRESS OF THE EPIZOOTIC AMONG HORSES IN 1872, WITH A TABLE OF MORTALITY IN NEW YORK.

By A. B. Judson, M.D., Assistant City Sanitary Inspector.

(*Continued from* p. 521.)

Report on the Epizoötic as it appeared in New York.

By A. F. Liautard, M.D., V.S., Chief Veterinary Surgeon to the New York College of Veterinary Surgeons, and Consulting Veterinary Surgeon to the Board of Health.

In the fall of 1872 a rumour reached us, through the newspapers, that a very serious and fatal disease was prevailing among horses in Canada, and especially in Montreal and Toronto. From the description given it was difficult to arrive at a positive or correct diagnosis, though the great similarity of the symptoms rendered it presumable that it was an attack of a typhoid nature, an *epizoötic influenza*, an affection very common in America.

Shortly afterwards the disease reached the State of New York, making its appearance at Rochester, Albany, and almost immediately in the city of New York.

On the evening of October 21st only a few animals were affected, but on the morning of the 22nd I doubt if there was a single animal of the equine species which was not attacked. Horses, mules, and even a zebra belonging to a menagerie, were affected almost simultaneously. More than 20,000 animals were suffering in different degrees, and it became apparent that the disease was influenza, of the catarrhal form, and fortunately not serious or fatal.

Forms.—The following are the principal forms under which this disease presents itself, viz., the adeno-catarrhal, the abdominal, the thoracic, and the nervous. The form which was most common in the city of New York and its vicinity was the adeno-catarrhal, although somewhat modified, as in none of the patients did we find the symptoms of adenitis well marked. The other forms also existed, but rather appeared as complications of the first, and occurred principally, if not entirely, in those animals which had been exposed to unfavorable atmospheric influences, or which had been submitted to improper treatment.

Symptoms.—The symptoms presented by the cases of simple influenza in the city of New York have been, with few exceptional cases, rigors, febrile action, impaired appetite, sneezing, cough, nasal discharge, accelerated respiration, weak and compressible pulse, dry fæces.

The attack was very sudden; the animal would be apparently well in the evening, and sick the next morning. The chills were generally followed by profuse perspiration. There was repeated sneezing. The cough was hard, difficult, dry, and spasmodic, even to such an extent as to threaten suffocation. In the majority of cases there was an abundant discharge from one or both nostrils, first mucous, afterwards muco-purulent in character. This flow was rendered more profuse by an excessive flexion of the head. Sometimes this discharge appeared entirely purulent, and was often expelled, after a paroxysm of coughing or sneezing, in large cheesy masses. In these cases the frontal and maxillary sinuses were principally affected. These symptoms were usually attended with more or less febrile action, though in some cases this was absent.

The larynx and intermaxillary organs were painful; and pressure upon them was followed by a spell of painful coughing. Respiration was more or less accelerated and difficult, depending in the first stage of the disease on the diseased condition of the anterior air-passages. The pulse was peculiar, sometimes 40 to 50 per minute, seldom more than 70. In all cases it was very weak and compressible. The temperature of the rectum varied from 101° Fahr. to 105°. In exceptional instances it was as high as 106° or 107°. Thermometric observations indicated that the temperature varied very much in the different stages of the disease. From 101° it would increase in a few hours to 104° or 105°, and then decrease to 103°, these oscillations being noticed as long as the disease lasted. In some cases the temperature remained above 100° for some time after the animal had recovered.

Loss of appetite was often the first symptom, and loss or impairment of the appetite occurred in every case with very few exceptions. In many cases where dry food was refused, the appetite could be excited by providing fresh carrots, turnips, apples, or potatoes, raw or boiled.

The ocular mucous membrane varied in appearance, in some cases being normal, in others slightly congested, and in many cases showing a well-marked yellowish hue.

The mouth was sometimes very warm and dry, but in many cases it was quite normal, with the exception of an abundant flow of thick saliva. The sub-maxillary lymphatic

glands were slightly enlarged and painful; but I saw only one case in which these glands suppurated. The thyroid bodies were more or less enlarged. The fæces were usually hard, dry, and passed with difficulty; occasionally they were soft. The urine was sometimes voided in great quantity, and toward the end of the disease it was often slightly bloody, thick, and turbid.

The movements of the animal were feeble and staggering (the *titubante* walk of the French). The skin was dry, and the hairs dull and staring.

Duration.—The duration of the mild catarrhal form is from two to three weeks, after which the animal can resume his work. In a few cases the symptoms disappeared altogether in eight or ten days, while in others more than a month elapsed before the nasal discharge had entirely ceased.

Complications.—The most common complications were thoracic. Pleurisy and pneumonia destroyed a large number of animals. A few cases of tympanitis and of colic, from impacted food, or from indigestion, were also observed, but none proved fatal. The nervous system was affected in a few cases in the form of cerebral or spinal meningitis. In these the result proved quite satisfactory.

Many of the hard-worked animals were attacked with purpura hæmorrhagica (the *mal de tête de contagion*, or *anasarque*, of the French), and a large number of these cases terminated fatally. In these cases the dropsy was general and excessive. The mucous membrane of the nasal passages and of the eyes was marked with petechiæ. The nasal discharge became bloody. As the œdema of the extremities increased, the skin cracked and permitted the blood to ooze through it. Locomotion became difficult, and mastication impossible. The temperature was high, and the pulse weak, compressible, small, and soft, numbering from 50 to 75 per minute. The respiration was accelerated and short, and an offensive odour was exhaled from the nostrils. Many animals were destroyed, under the impression that they were affected with glanders or farcy. This complication usually terminated in death after a period varying from a few hours to four or five days.

Hæmaturia often existed, either as a primary symptom or as a complication, but never assumed a serious nature. Severe attacks of laminitis of two or four extremities were often seen.

Another complication, of frequent occurrence, not serious in character, and confined to horses reduced by hard work, poor food, and bad stabling, was œdema of the extremities

extending from the knee or hock down to the hoof. This œdema, which was often mistaken for the dropsical swelling of purpura hæmorrhagica, disappeared with a little exercise, and reappeared as soon as the animal was returned to the stable. This complication permanently disappeared as soon as the animal regained his appetite and strength.

Post-mortem.—The results of Prof. Liautard's autopsies are presented among the records of *post-mortem* investigations, on page 599.

Prognosis.—Influenza being essentially debilitating in its nature, the animals which succumbed to the disease did so from exhaustion induced by the excessive work to which they have been subjected, or they died from complications. Sometimes, after the disease had subsided, a relapse occurred, and careful observation showed that this is to be attributed to neglect of hygienic measures, or that it occurred during the existence of unfavorable atmospheric conditions.

Treatment.—The treatment of influenza must be in accordance with the symptoms. During the simple catarrhal form of the disease the diet should consist of dry or boiled oats, mashes, oat, rye, or corn meal gruels, roots, and fruits. These articles should be varied and given in small quantities. The temperature should be regulated by blanketing, bandaging of the extremities, and general or local friction. Good ventilation should be secured, and disinfectants used in moderation.

In the majority of cases the hygienic measures above mentioned, together with rest, will prove entirely sufficient to effect a cure. Rest is of the utmost importance. Without it the animal will scarcely escape some of the sequelæ of the disease. Experience has taught me that rest is of paramount importance, for all those animals whose labours were suspended as soon as they were taken sick escaped complications and resumed work in a few days. On the other hand, a large mortality occurred among railroad and stage horses. Many of those animals, being kept constantly at work, were attacked by serious complications, purpura hæmorrhagica being the most frequent and perhaps the most fatal.

If the throat is swollen and painful, stimulating liniments, mustard applications, or blisters, must be used. Steaming with boiling water and with decoctions of poppy-heads or marsh-mallow leaves, with the administration of electuaries of belladonna, renders the cough less painful, and, if mixed with some preparation of antimony, such as kermes mineral, facilitates expectoration. A tendency to constipation may require injections containing soap or sulphate of soda.

Bleeding, sedatives, purgatives, and setons, must be entirely laid aside, or, when resorted to, it should be with great discretion. The practitioner should ever bear in mind that this affection is essentially of an asthenic character. As there is debility almost at the very outset, the disease requires not antiphlogistic measures, but supporting treatment almost from the beginning. This is especially the case if the appetite is impaired, the pulse weak and small, and the walk staggering. Under these conditions, diffusible stimulants, such as preparations of ammonia or camphor, combined with vegetable tonics, such as gentian or cinchona, are indicated. Drenches of ale or of brandy have been successfully administered, but they must be used with care, on account of the laryngitis which sometimes exists.

The complications must be met with such treatment as each case may require. The treatment adopted by me in purpura hæmorrhagica included stimulating frictions to the swellings, fomentations of decoctions of aromatic plants, drenches of bitter and aromatic tonics, such as chamomile or elder-flower tea, and scarifications when necessary. Peruvian bark or gentian was used in combination with mineral tonics, especially the sulphate, phosphate, or iodide of iron, or in some cases with the bisulphate of soda, or a few drops of carbolic acid. These combinations were given in powders or pills, or in drenches, according to the appetite and the facility of deglutition. The hypodermic injection of quinine and citrate of iron has been successfully employed. Diuretics may also be administered. Of these, oleum terebinthinæ, in ounce doses, is perhaps the best. In larger doses it is liable to give rise to abdominal troubles. If diuretics are used, the urinary secretion is to be carefully watched, so as to avoid hæmaturia, which very often appears

When the purulent collection in the sinuses is very abundant and the frontal bone displaced by the pressure of the pus, and when respiration is thus impeded, I would recommend trephining, a simple operation affording immediate relief, not attended with danger, and leaving no disfigurement after cicatrization.

Summary of Observations made by Health Inspectors.

The Inspectors of the Health Department of New York were directed to inquire into and report on the manifestations of the disease in their respective districts. An analysis of their reports shows: 1. That all, or very nearly all, the horses in the city were affected by the disease; 2. That the symptoms appeared suddenly, not only invading nearly all

the stables at once, but affecting at once nearly all the horses in each stable; and, 3. That the disease attacked impartially the well-housed and well-fed, and those exposed to hardships. Views adverse to those were expressed by none of the Inspectors who reported on this disease.

Assistant Health Inspector W. E. Hall, M.D., reports, November 4, 1872, as follows: "The disease first made its appearance at this establishment (Prince and Crosby Streets —seventy-five horses) the 22nd ultimo, and in forty-eight hours from that time every horse in the stable was sick. The disease observed no regularity in spreading, not passing from stall to stall, as would probably have been the case were it contagious, but breaking out simultaneously in different portions of the building, and observing no order in its spreading."

Assistant Health Inspector A. McL. Hamilton, M.D., reports, November 4, 1872, as follows: "I have visited fifty-eight stables, and inspected five hundred and four horses. Out of this number about seven eighths were sick; in fact, it is doubtful if all were not sick, some being affected but lightly. In the most cleanly kept places the disease seemed as prevalent as in the dirtiest and most crowded stables. The disease appeared almost simultaneously in all the stables, and in each stable the horses became sick within one or two days."

Health Inspector S. F. Morris, M.D., reports, November 1, 1872, as follows: "At the first stable (seventy horses) we found all the horses more or less affected with the prevailing epidemic. The other three stables, containing over five hundred and fifty horses, were so similar to each other that we will speak of them collectively . . In all of them very few of the horses have escaped, although some have had it very much worse. The symptoms were constant in all cases: 1. Severe, dry cough: 2. Loss of appetite, drooping, and want of animation: 3. The appearance of a mucous and muco-purulent discharge from nostrils."

Health Inspector Charles F. Roberts, M.D., reports, November 2, 1872, as follows: "As near as I can ascertain, there is no horse in the district that has not been affected with the epidemic, although in some cases to such a slight degree that the only observable symptom has been a cough, variable in degree according to the intensity of the affection. The number that have shown only this symptom has been, however, comparatively small. I should judge about eight or nine per cent."

Health Inspector Henry R. Stiles, M.D., reports, November 4, 1872, as follows: "In every stable which I visited

I found that every horse had been or was affected more or less with the disease. Only one case was found of a horse which had been in entire good health, and worked daily throughout the prevalence of the epidemic, thus far. I could not find, either, that horses, surrounded by the apparently unfavorable sanitary conditions which obtain in many of the stables in my district, were more generally or more powerfully affected than those in the best stables."

Assistant Health Inspector R. S. Tracy, M.D., reports as follows: "I have visited fifty-five stables, occupied by three hundred and twenty-four horses. I found fifteen horses reported as not having been sick at all. The disease appears to have been almost universal, and I am inclined to think that the animals reported as untouched by the disease may have had so slight an attack as to pass unnoticed. In two cases where horses were reported as having been entirely free from the disorder, I found they had a slight cough, but with no discharge from the nose, which appears to be considered the pathognomonic symptoms by some horse-owners."

Records of Post-mortem Investigations.—By A. B. Judson, M.D., *Assistant City Sanitary Inspector.*

Case 1.—Autopsy conducted by Prof. Liautard.—The subject was a small bay horse examined the previous day at the hospital of the Third Avenue Railway Company. He had been in good condition before the epizoötic, and was taken sick about October 21st, with cough, loss of appetite, and weakness. The pulse 74; respiration 30, and difficult; temperature 102°; copious muco-purulent discharge issued from the nostrils; extremities œdematous; step very slow and uncertain; the head drooped, and the eye was dull. The animal was killed by a blow on the head. The muscles were of a natural colour, and the joints in a healthy condition; heart, liver, intestines, spleen, kidneys, and bladder, healthy in appearance; the mucous membrane of the maxillary sinuses and nasal passages was covered by a semifluid muco-purulent matter. When these collections were removed, the redness of the membrane was exposed to view. The pharynx, larynx, and trachea were in a normal condition. Both lungs were moderately congested.

Case 2.—Autopsy conducted by Prof. James L. Robertson, M.D., New York College of Veterinary Surgeons.—Subject was a black horse, killed November 2, 1872. Pulse 108; respiration 28; temperature 102°. No œdema; nostrils dis-

charged a dark-brown fluid; eyes dull; and the motions of limbs slow and spiritless. He was killed by a blow on the head. The œsophagus, stomach, liver, and small intestines healthy, but the redness of the mucous lining of the large intestine gave evidence of local determination of blood, which might have been caused by some purgative medicines. The heart was healthy; bladder healthy and contracted; spleen and kidneys had a normal appearance. The spleen weighed four pounds, and the kidneys two, and two and one eighth, pounds. The mucous membrane of the nostrils was congested, and, on removing the skin of the face and portions of the superior maxillary and nasal bones, large portions of the lining membrane of the cartilaginous septum, the nasal passages, and the facial sinuses, were congested. The redness was most intense in the mucous covering of the turbinated bones. All the nasal passages and the communicating sinuses contained, and were partly obstructed by, mucous secretions. The turbinated bones were covered by a dark brown fluid similar to the discharge observed in the nostrils before death. This fluid was probably derived from the lungs, a portion of which was found in an advanced stage of inflammation, and not from the mucous lining of the nasal passages.

This case illustrates the fact that expectoration in the horse is performed by the nostrils, and not by the mouth. This peculiarity was still better illustrated in a case detailed below, in which a white, frothy fluid was pressed from sections of the lungs. Several ounces of a similar fluid were found in the trachea, and during life a similar fluid had appeared as a copious nasal discharge.

The larynx was healthy, and the lining membrane of the trachea was normal in colour for the anterior two thirds of its length. The posterior third was reddened, and this evidence of inflammation extended, in less marked degree, into the bronchi and bronchial tubes of both lungs. The section of the lungs through their superior portions was of a bright red colour. The lung tissue, in the superior portions, contained air, and was buoyant. The inferior edges and anterior lobes presented a dark chocolate colour, resembling the colour of the nasal discharge and of the liquid found covering the turbinated bones. The lung tissue in these parts was collapsed, sinking when thrown into water.

Fig. No. 1 represents a section of the lungs and a portion of the trachea of this subject.* The sketch was drawn

* This and other figures referred to are printed in colours. We have been unable to reproduce them.—[Eds.]

and coloured, during the progress of the autopsy, by Mr. Köhler.

Case 3.—On November 4, 1872, I examined a roan black horse about twelve hours after death. The body was emaciated; no œdema appeared; a dirty-yellowish discharge appeared at the nostrils. The stomach, liver, intestines, spleen, and kidneys, were normal. The spleen weighed three pounds, and the kidneys one and three quarters of a pound each. The right ventricle was distended. Its endocardium was dark crimson, while the left ventricle was collapsed and normal in colour. The mucous membrane lining the nostrils, the cartilaginous septum, the turbinated bones, and the maxillary sinuses, were reddened. These parts were found obscured by collections of mucous secretions, which were washed away by the stream of water turned on to remove the blood of dissection. The mucous membrane of the trachea was obscurely discoloured, the prevailing colours being brown, red, and green. The bronchi and bronchial tubes, as far as they were distinguishable, presented the same discoloration.

The deep red and green discoloration of the inside of the trachea does not appear to be an important pathological change. The appearance of the trachea was observed and recorded in seven of the *post-mortem* examinations herein described. The deep red and green discoloration was seen in the two subjects that had been dead several hours, and was absent in the four that were killed for dissection, and in one case in which the time of the animal's death could not be ascertained. Observations, made several months after the epizoötic had passed, proved that the discoloration of the trachea is a common *post-mortem* change.

The trachea and the tubes contained a limpid, dark-brown fluid. The inferior portions of both lungs were collapsed. Fragments cut from these portions sank in water, and yielded on pressure a fluid resembling that found in the trachea and bronchial tubes. The colour of the section, and of the pulmonary pleura of these portions of the lungs, was dark chocolate brown, resembling somewhat the colour of the fluid found in the trachea and tubes. The superior portion of the right lung was healthy in appearance. The mass of lung tissue not already described contained air, and presented externally a normal appearance.

Fig. No. 2 represents a dissection of the nasal passage and facial sinuses of this subject.

Fig. No. 3 represents a dissection made November 4, 1872, of a portion of the respiratory passage of a horse,

which shows congestion of the epiglottis, larynx, and trachea.

Case 4.—On November 5, 1872, I examined a sorrel horse (No. 1). There was no œdema; a copious white frothy discharge issued from the nostrils, and was scattered about by the forcible expirations of the animal. His eye was quick and intelligent; had considerable strength, and good control of his limbs. The pulse was 60, and the temperature 100¼°. He was killed by a blow on the head. The stomach, large and small intestines, spleen, bladder, and kidneys, were healthy; spleen weighed three pounds, and the kidneys two pounds and three pounds; the pericardium and the endocardium were healthy. The liver was of a darker colour than natural, and on section blood issued freely from its tissue. The lining membrane of the nasal passages and of the larynx, the trachea and the bronchial tubes, so far as they could be distinguished, were healthy. The trachea and bronchial tubes contained a limpid white fluid, which was readily beaten into froth by the movements of respiration. The trachea contained several ounces of this fluid, which in colour and consistency resembled milk. The lung tissue, at the edges and in the inferior portions of the lungs, on section, showed a dark red colour. In the other portions the external appearance of the lungs was healthy, and the lung tissue contained normal quantity of air. On section the appearance of these portions of the lungs was at first normal, but the colour soon changed to a vivid scarlet. Pressure on these portions of the lungs forced from the finer tubes a frothy liquid, resembling that found in the trachea and discharged from the nose.

Case 5.—On November 7, 1872, I examined a sorrel horse (No. 2). A yellowish discharge tinged with blood appeared at the nostrils; the extremities were œdematous. This condition was so well marked in the hind legs that a bloody fluid oozed from the excessively distended integument. The pulse was 72, respiration 20, and temperature 98°. He was killed by a blow on the head. The heart, liver, spleen, kidneys, bladder, and large and small intestines, were healthy. On section of the œdematous parts, the subcutaneous cellular tissue was of a very dark red colour, due to the escape of the colouring matter of the blood. The lining membrane of the nostrils was of a dark red colour, and free from ulcerations. The lining membrane of the larynx, trachea, bronchi, and bronchial tubes, was healthy. The lung tissue generally contained its normal quantity of air, but the anterior lobes and

inferior edges cut more firmly, and presented on section a dark hepatic colour. Slices from these portions seemed to contain but little air, although they were buoyant.

Case 7.—Fig. No. 4 represents a specimen taken from a bay mare which had been sick about four weeks with influenza, and consequent purpura hæmorrhagica and inflammation of the lungs. The dissection was made nine hours after death. The epiglottis is turned under the soft palate. The figure shows the healthy condition of the mucous lining of the pharynx and base of the tongue, and the intense congestion of the floor of the posterior nares, or superior surface of the soft palate, and a degree of congestion less intense in that portion of the lining of the larynx which is exposed to view.

Case 8.—Fig. No. 5 represents a specimen taken from a white horse killed for dissection, November 16, 1872. He was suffering from purpura hæmorrhagica following influenza. There was some œdema of the extremities. The œdema of the face and nose was very great, closing the lids and frightfully disfiguring the features. The pulse could not be taken, on account of its weakness and the animal's spasmodic and extraordinary efforts to sustain respiration through the diminished air-passages. The respiration was 48, and the temperature 101°. The horse was killed by a blow on the head. The section of the distended tissues under the skin of the face was of a very deep red colour. The figure represents a section of the muscles and integuments of the face obtained by making two parallel incisions between the masseter muscle and the angle of the mouth on the right side, both incisions being made to the bone, and extending from the suture of the nasal bones to near the median line of the lower maxillary. The portion included between the incisions was then dissected up from the upper and lower maxillary bones. The arrangement of the cellular tissue and inclosed portions of adipose tissue gave an appearance of striations to a part of the specimen, while between the striated portion and the buccal mucous membrane the buccinator muscle appeared almost black from extravasation.

The figures mentioned above are from sketches drawn in water-colours by the late Robert Köhler, whose drawings illustrate the Texas Cattle-Disease in the Annual Report for 1868.*

Case 9.—Fig. No. 6 represents a specimen taken from a

* A melancholy interest belongs to these pictures from the fact that the artist was taken sick with pneumonia while engaged in the work, and died before the completion of the series. Fig. No. 5 was the last labour of a long, useful, and respectable life.

sorrel horse (No. 3), affected with purpura hæmorrhagica following influenza. The dissection was made November 27, 1872, about twelve hours after death. Œdema was well marked in the extremities, and extended to the inferior and anterior portions of the trunk. The body was well nourished; the fat was of a decided yellow colour. The muscles appeared healthy, excepting that, in all parts of the body, a section of the muscular tissue presented patches of a very deep red colour. The portions of muscular tissue thus discoloured were surcharged with bloody fluid, as was shown by the fact that the normal hue of the adjoining healthy muscular tissue was more deeply reddened, immediately after section, by the superfluous bloody fluid from the dark patches.

The results of *post-mortem* examinations made by Prof. Liautard are presented in the following words taken from his report:

"The lesions discovered at the autopsy are very limited, differing according to the complications which existed during life, whether pulmonary, abdominal, or nervous. In the catarrhal form, I found the lesions principally in the anterior chambers of the respiratory apparatus. The mucous membranes of the nasal fossæ, turbinated bones, frontal and maxillary sinuses were injected and covered at various points with large, blackish spots, some in an ulcerated condition. These parts were filled with a mass of muco-purulent matter, sometimes sanious or bloody, and often of a very offensive odour. In one case the frontal bones were softened. The mucous membrane of the larynx, trachea, and bronchial tubes, was more or less injected, and at some points ulcerated, thickened, soft, and easily torn from its attachments.

"When death results from thoracic complications, we find the lesions of pneumonia, pleurisy, pericarditis, &c. The usual appearances indicating inflammation of the pleura and pericardium are found, such as effusions of a muddy and reddish liquid, adhesions, &c. The lungs are found highly congested, splenized, hepatized, suppurated, or gangrenous.

"In the abdominal or nervous forms of the disease the principal lesions will, of course, be found in the organ chiefly affected. I may say at this time that I have never seen Peyer's patches ulcerated, though this lesion is so often described by some French writers.

"When purpura hæmorrhagica has supervened, we find the cellular tissue of the œdematous parts infiltrated with a citrine serosity more or less abundant. The muscles in

different parts of the body present large extravasations of blood. The mucous membrane of the nasal fossæ has a blackish-red appearance, and presents petechial ulcerations and gangrenous spots. The larynx is also highly inflamed. In one case, I found œdema of the glottis. The lungs in some cases are apparently sound, in others they present large apoplectic spots of bloody extravasation, or are infiltrated with serum principally at the lower border of the lobes. The anterior lobes are sometimes gangrenous.

"The heart may be pale, flabby, and softened, with ecchymotic spots on the endocardium, the cavities being occupied by a white clot, or with black uncoagulated blood.

"When the external œdematous swellings suddenly disappear, as they may before death, the intestinal canal will be the seat of bloody and serous infiltration between the mucous and muscular coats."

The morbid appearances, as observed by Assistant Health Inspector Simeon N. Leo, M.D., are described in the following extracts from his report, dated November 3, 1872:

"The first case was a bay horse about twelve years old. Respiration 39, pulse 82, with a large muco-purulent discharge from nostril. The mucous membrane of nostril discoloured. On removing the trachea, it was found congested, and filled with a large quantity of muco-purulent matter. The lungs crepitated and floated in water, the smaller bronchial tubes filled with a quantity of the same material as noticed in the trachea. The spleen was enormously enlarged and congested. The small intestines were marked in some places with points of congestion; all the other organs were examined and found in a normal condition.

"In a horse that had been dead at least fourteen hours, the mucous membrane of the larynx and trachea was of a dark greenish tinge. The bronchial tubes of the right side were filled with a thick, glairy secretion, of a greenish tinge; the lung substance was very red, and the bronchial tubes were of a still deeper colour, containing a rusty looking fluid. The spleen was also very large.

"The next case furnished evidence of pneumonia in the stage of grey hepatization, in portions of both lungs. The spleen also presented a striking contrast to the others, being very small in comparison."

Mycological Experiments.—Hermann Endemann, Ph. D., Assistant Chemist, reports the results of his mycological examinations as follows:

"The various fluids and secretions of the body of an infected horse contain vegetable cells. It is, however, exceedingly difficult to actually discover them in these fluids a short time after the samples had been taken, on account of their being exceedingly small (micrococcus). The micrococcus cells were discovered in urine and bile, none could be detected in the blood. Their presence, however, became finally evident from their further development.

"If urine containing micrococcus is allowed to stand for twenty hours, most of the micrococcus are converted into cryptococcus cells, which at once begin to sprout, forming within three to five days a dense net of filaments. If at this time not removed from the urine, they are generally destroyed by the products of an accompanying alkaline fermentation; but, if removed to either solutions or dry objects, they continue to develope, forming finally, in from nine to twelve days, sporangia, which, according to the constituents of the objects on which they are grown, differ in appearance.

"The blood of two horses and the urine and bile of one of these horses were examined in this direction, and always the same result has been obtained.

"The forms of the fungus thus obtained are much like those of *aspergillus glaucus*. The colour of the sporangia as first obtained was dark brown; but subsequent examination showed that the colour is not material, as it easily changes into a rusty brown, or light and dark green, without change of form, if grown on objects of varying composition. The same mycelium which developes the *aspergillus sporangia* often shows sporangia bearing penicillium characteristics.

"In May, 1873, a disease resembling epizoötic influenza broke out in the Coney Island car-stables, in Brooklyn. Having obtained specimens of urine and nasal mucus from the animals affected, I at once commenced the cultivation of the fungus. The results of these examinations were identical with those obtained before.

"The apparatus in which the germinative experiments were made differs from others described and in use; but recommends itself by its simplicity. On a porcelain plate a glass stand supports a watch or plain glass, which holds either the solutions, or dry objects, used as nourishment for the growing fungus. This stand is then covered with a common water-glass, and a concentrated solution of sulphate of copper poured on the plate. The solution thus separates the outside air from that under the glass cover. For the requisite amount of oxygen under the glass cover, I rely on the

active diffusion of air through the fluid. Before use the apparatus is well disinfected by immersing it in absolute alcohol, and then drying it at 250° Fahr. The same agents, alcohol or heat, or both, are used for the purification of solutions and dry materials destined to serve as nourishment for the fungi.

"Finally, I wish to state that experiments made for control during the prevalence of the epizoötic by purposely exposing solutions to the air, as well as those made about one year afterwards, with urine from healthy horses, resulted invariably in the growth of penicillium glaucum."

Chemical Examination of Blood.—The results of chemical examination of the blood in cases of influenza and purpura hæmorrhagica are reported as follows by Dr. Endemann:

"The samples which I examined were mostly taken from sick animals which were killed at the dock of the Rendering Company at Thirty-eighth Street and North River. They were collected in bottles especially and carefully prepared for this purpose, and speedily brought to the laboratory for immediate examination. Bottles, with their corks, for receiving the samples, as well as apparatus for the subsequent development of the micrococcus cells, were, after careful cleaning, disinfected with absolute alcohol, and then either dried in a hot-air chamber at a temperature of 250° Fahr., or washed with boiled Croton water.

"The blood was in all cases, even if drawn from the aorta or carotid arteries, dark coloured. It was uniformly found to contain a large excess of extractive matter and fat, which might have been caused either by an inactivity of such organs as kidneys or lungs, or by an excessive decomposition or fermentation of healthy blood constituents in the blood itself, or by an overabundant action of the liver. Venous blood is always richer in extractive and fatty matters; the purification, however, which it undergoes in the above-named organs removes them again, so that arterial blood contains these substances only in very minute proportions, as compared with the results of my late examination of the blood of sick animals.

"It is also remarkable that this increase, especially in extractive matter, was more marked the more time elapsed from the time of the first attack up to the time the animal was killed. I assume here that most of the animals were attacked about the same time.

"The sums of fat and extractive matter found in the blood of different animals were, on—

October 30th	23·1.
November 2nd	15·1.
November 5th	70·6.
November 16th	98·1.

"The following tabulated statement gives the results obtained, compared with the composition of normal horse-blood—these figures being the average of a number of well-authenticated analyses:

1. Normal blood.
2. Horse killed at the rendering-dock October 30th.
3. Horse killed at the rendering-dock November 2nd.
4. Horse killed at the rendering-dock November 5th.
5. Horse killed at the rendering-dock November 16th.

"Horse No. 5 had recovered from the disease, but was at the time sick with a secondary stage of the disease (dropsy), which had manifested itself during the middle of November in numerous cases throughout the city.

1000 *parts of Blood contain*—

	1	2	3	4	5
	Arterial.	Average Sample.		Arterial.	
Fibrine	6·6	8·4	4·3	15·5	4·1
Blood-corpuscles and albumen	202·0	160·2	214·8	121·3	110·0
Fat	0·8	5·4	3·2	70·6	3·7
Extractive matter	2·9	17·7	11·9		94·4
Salts	7·7	6·8	7·7	7·1	8·6
Total solids	210·0	177·9	241·9	214·5	220·8
Water	790·0	822·1	758·1	785·5	779·2

"The qualitative examination of the extractive matter showed that it was largely composed of the constituents of the bile and urine."

Microscopical Appearances.—Prof. Liautard reports that "the microscopical examination of the nasal discharge exhibits mucus- and pus-corpuscles, together with a large number of spores of various kinds, whose nature has not as yet been fully determined."

Portions of blood drawn from horses while under treatment for purpura hæmorrhagica following influenza, were microscopically examined by Assistant Health Inspector William E. Hall, M.D. His first specimen was taken from a horse which presented an extremely well-marked case

of purpura hæmorrhagica. The animal made a tedious but very good recovery. Dr. Hall reports as follows :

"The blood was caught in a two-drachm vial, immediately sealed, and submitted to the microscope, not more than ten or twelve minutes elapsing between the time of sealing the bottle and exposing the fluid for examination. The blood was very dark when drawn, flowed with difficulty, and formed a firm clot at once. Nearly one third of the red globules in the field showed important changes; they were crenated, very finely granular, smaller in size, and more opaque than the globules of normal appearance. There was a granular *débris* scattered through the field—remains of disintegrated corpuscles. This was very small in quantity. Three pigment-granules were also in the field.

"The second specimen was taken from a case of purpura hæmorrhagica, in which the disease was less severe—complete recovery following two weeks' treatment. The blood was submitted to the microscope about twenty minutes after having been drawn. Many of the red corpuscles had arranged themselves in *rouleaux*. A few finely granular, crenated, red globules were present, but the ones presenting a healthy appearance were much in excess—about as twenty to one. Three small pigment-granules presented themselves. This completes the conditions found in the second specimen."

The purpura hæmorrhagica, which was present in both cases, is probably due to nutritive changes in the smaller vessels rather than to any conditions which the blood presents.

Conclusion.

One of the results of the investigations detailed in the preceding pages is the confirmation of the opinion commonly held by medical authorities, that Epizoötic Influenza is the counterpart of Epidemic Influenza. They are both specific febrile diseases, in which the specific poison produces disordered function of the great nervous centres, and acts on the mucous membrane of the eyes, of the nose, and of the bronchi.

The definition of Influenza given in Aitken's 'Practice of Medicine' applies with exactness to Epizoötic Influenza, if a few unessential words are omitted. Leaving out the subjective symptoms, and substituting *epizoötic* for *epidemic*, this definition reads as follows: "A specific febrile disease, invariable in its essential characteristics, frequently prevailing as an epizoötic, attended with lassitude, and prostration to

an extreme degree; chills, the eyes injected and tending to fill with tears, the nostrils discharging an acrid fluid; cough prevails, with yellow expectoration. Fever attends the disorder, sometimes slight and sometimes severe, and of a type varying in different epizoötics and localities."

Epizoötic Influenza is the counterpart of Epidemic Influenza, not only in its pathology and definition, but also in certain other important features which are common to both diseases, among which are the following: 1. It has at intervals overrun portions of the globe from early times; 2. It attacks all or nearly all individuals; 3. The rate of mortality is low, the character of the prognosis depending on the condition in which the disease finds its victim, and on his ability to secure rest and supporting treatment, rather than on the virulence of the specific poison.

As the effects of the prevalence of Epizoötic Influenza on commerce, and on the general welfare of the community, are extremely injurious, inquiries in regard to its methods of propagation, and in regard to practicable measures of prevention, are very important, the more so as the facts obtained will probably apply to its counterpart, Epidemic Influenza. The result of the preceding investigations into the methods of propagation of Epizoötic Influenza is the presentation of abundant and convincing proof that it spreads from city to city, and from country to country, by virtue of its communicability, and regardless of atmospheric conditions. This proposition should be qualified by the statement that the apparently sudden seizure of all the horses in a city, or limited neighbourhood, renders it possible that within narrow limits it infects through the atmosphere.

From the views of this subject which have been presented above, it is evident that the introduction of Epizoötic Influenza can be prevented by arresting communication, by means of horses and mules, with those places in which the disease exists. Its importation by sea can be prevented by quarantine. Its importation overland can be prevented by the establishment of a *cordon sanitaire*, but this method would, from the nature of the case, be successful only in exceptional and very favorable circumstances.

In regard to Epidemic Influenza the same rules probably hold good, but their application is impracticable. The arrest of intercourse between two adjacent countries or sections, or the enforcement of quarantine with the requisite severity, would be more disastrous than an epidemic of influenza.

LECTURE ON RABIES.

By G. Fleming, M.R.C.V.S., at the Manchester Exhibition of Dogs.

Mr. George Fleming, of Brompton Barracks, Chatham, late President of the Central Veterinary Medical Society, delivered a lecture on "Madness in Dogs." Mr. Jesse Leech, M.D., J.P., of Heywood, presided. There was a fair attendance, including several of the principal medical practitioners in Manchester.

The Chairman, in introducing Mr. Fleming, said that the subject was one of the greatest importance to the community at large, and that afternoon they were to have the opportunity of hearing a gentleman speak upon it who had studied it carefully, and who from his position held a very high reputation amongst veterinarians. To Manchester the subject was of especial importance, inasmuch as the enterprising proprietor of Pomona Gardens, together with the scientific committee who supported him, had offered every encouragement for the discovery of a cure for the dreadful disease of hydrophobia. (Applause.)

Mr. Fleming, who was warmly received, said the subject of the lecture not only concerned the welfare of the dog, but also of the human race. Mr. Reilly had been the first to initiate this new feature into dog shows, and he deserved great praise for the efforts he had made in this direction. It was, therefore, with much pleasure that he seconded the effort made to popularise the knowledge as to the symptoms of rabies, so that the public might be able to recognise them and protect themselves from its evil consequences. Had this course been carried into effect at the agricultural shows, it was not unlikely that the contagious diseases of cattle and horses, which now caused so much loss to the country, would have been greatly mitigated. Lancashire and the North had been severely visited by rabies in the dog for some years past, and the number of lives lost owing to canine madness had begun to be looked upon with dread by the public. As the subject of the lecture was "Madness in the Dog," it had been thought that that was a fair opportunity for describing its principal features, and the best means of preventing its disastrous effects. This dog-madness was in its nature a specific disease, which was generated, not only in the canine species, but also in the fox, wolf, jackal, hyena, cat, skunk, and other animals; but owing to the peculiar relationship of the dog with mankind, the disease exposed the human species to great risks. This infirmity ought to be closely investigated, and means taken, if not to cure it, at all events to prevent its ravages. It was curious to notice the geographical extension of this malady. Rabies in the dog

was limited to certain countries and to certain portions of countries, and yet they could not tell why. The malady was unknown in America, in New Zealand, South and West Africa, and yet in North and East Africa it had frequently occurred. Its ravages had also been experienced in India, in China, and indeed over the whole of the Asiatic continent. It had not been witnessed in St. Helena or in Madeira, and yet in other islands similarly geographically situated it constantly prevailed. Western Europe was scourged by it; and the loss of human life from the bites of rabid animals in Germany and France was very great, and the disease seemed to be progressing in this country. Strange to relate, there were only certain parts of Great Britain which were most severely visited. In Ireland the disease was scarcely known; it was the same in Scotland; and in the east, south, and west of England it was extremely rare; but in the north of England it had prevailed as a general outbreak for four years. In 1870 there were thirty-two deaths from hydrophobia, nearly the whole of which were in the northern counties. Of the nature of the disease little was known. It had been ascertained for certain that it was a disease transmissible to all warm-blooded animals, that its transmission only took place through inoculation, that the poison existed in its most concentrated form in the saliva of the rabid animal, and that it produced its effects upon the brain, the digestive organs, and the salivary glands in particular. It had been said that the disease was insanity, but this could not be, as insanity in the human species was not transmissible by inoculation. The existence of the disease had been denied, and certain authorities had asserted that it was purely imaginary; but this was a fallacy, as there were innumerable well-established facts to prove that not only mankind but all animals had been affected by inoculation accidentally or experimentally. With regard to the cause of the disease, it could only be said that in 99 cases out of 100 it was due to contagion. Almost every assignable cause had been suggested, but none except contagion could be accepted. From present knowledge it could not be denied that spontaneous generation might be possible, but it was not known under what conditions it could be generated. The seasons had been invoked as one of the principal causes, and the term "dog days" had become familiar; but it had been clearly ascertained that in hot weather there were fewer cases than in temperate weather. It was a great mistake to suppose that the symptoms were at first of a furious character. After an animal had been inoculated the interval which elapsed before the appearance of the earliest symptoms might vary from a few days to months.

For the facility of description the disease might be divided

into three stages. The first stage was marked by the changed habits of the dog, and by its altered appearance and behaviour. It became dull, gloomy, and morose, and was desirous to conceal itself beneath tables and chairs, but even in its retirement it could not rest. While in this condition it might at times be lively and extremely affectionate for a few moments. It had a tendency to pick up straws, threads, &c.; and to lick anything cold, such as stones or iron, or the noses of other dogs. There was no propensity to bite, and the animal remained docile with its master. The restlessness then began to increase, and the dog appeared as if it was haunted by some horrid phantoms or hallucinations. At times it would seem to be watching the movements of something on the floor, and would dart suddenly forward and bite at the vacant air as if pursuing something against which it had an enmity. At other times it would throw itself against the wall, yelling furiously as if there were a noise at the other side. It still remained docile and submissive, and its master's voice would always rouse it. Soon it began to manifest a desire to lick the human hand, but this was very dangerous, because if there was any abrasion of the skin the saliva, which was poisonous from the commencement of the disease, might be absorbed. Caressing was, therefore, more dangerous than biting. It was rare indeed that a dog at this stage attacked its master, and the sentiment of affection was so strong that the master could always control the animal even at a late stage of the disease. These early symptoms were very significant, and should be known by every one, for upon their prompt recognition, more than upon Acts of Parliament or medical skill, depended the prevention of the malady. At no period of the disease was there a dread of water. The idea that a rabid dog was afraid of water was derived from the symptoms of the transmitted disease in man, but this dread was never seen in the dog, cat, or any animal affected with rabies. This error was a very grave one, and one which had given rise to most serious results. Water was often put before a dog as a test, and when it had lapped freely it had been pronounced free from the disease, and had been allowed to go at large and commit all kinds of ravages. The dog afterwards began to gnaw at carpets, &c., and its thirst was great. It acted as if it had something in its throat, and appeared to be trying to remove it. This was a very characteristic symptom, and one which at once distinguished the disease if the dog rolled over. People were often led to believe that there was something in the animal's throat, and on attempting to remove it were fatally wounded by its teeth. Several instances of this kind had occurred in the neighbourhood of Manchester. At this period the dog's sensibility became blunted, and it went into a very excited state at the sight of its own species.

This was a most important feature in the disease, as affording a proof of its presence. Therefore, when, contrary to its habits and natural inclination, a dog suddenly became aggressive to other dogs, it was time to take precautions. A dog affected with rabies had a tendency to run away from home; and on returning, worn out and covered with mud, was in a most dangerous condition, as its propensity to bite had then become imperious, and overruled its affection. These might be said to be the precursory symptoms of the true mad or furious period; and it would be observed that rabies was not what it was usually imagined to be, a disease characterised by a continual state of fury. A peculiar feature of the malady was the alteration of the bark, which, from a clear and sonorous sound, became harsh and hoarse. This sudden and strange alteration in the voice of the dog ought to at once attract attention. The alteration was heard in the majority of rabid dogs; in others, only when excited; and, in rare cases, it was not present. It would be seen, then, Mr. Fleming observed, how necessary it was for the prevention of alarm and the preservation of human and animal life that an acquaintance with or a knowledge of these initial symptoms should be acquired by every one; for who was there who was not more or less among dogs, and who might not at any moment have to do with an animal in this condition? The insidiousness of rabies, and its terribly destructive character, in man and beast, were surely sufficient to impress upon all the necessity of learning all that they could with regard to its suppression, and in no way could they more successfully contend with the scourge than by knowing the earliest symptoms which indicated its existence. When in a rabid state, if the dog was at large, it went freely forward as if compelled by an irresistible influence, travelling considerable distances in a short time, and snapping at every live creature in its path, but always preferring to do so at dogs. It always attacked animals in silence, and emitted no cry of anger or pain if it was punished. The ferocity of the animal depended upon its training; if it was much domesticated or a pet dog, it only snapped or gave a slight bite in passing, while other dogs not similarly trained would bite furiously, even to the extent of breaking their jaws. Dogs under such attacks would run until exhausted, and then drop down, death resulting from paralysis or asphyxia. One form of the disease was much more tranquil than that already described, and was called the dumb form, in which case there was a paralysis of the lower jaw, and the mouth gaped—the animal appearing to demand more pity than fear—nevertheless, this form of the malady was very dangerous, as the saliva was as virulent as in the furious form. The lecturer then proceeded to observe that though a wide outbreak of madness in dogs

was to be regarded as a serious matter, the disease was nevertheless subject to the control of human agency. The premonitory symptoms were always well marked, and it required only ordinary care to prevent the disease extending. There was no cause for alarm, as far as the malady in the human species was concerned, for the mean annual death-rate from hydrophobia in England for fifteen years to every million of inhabitants was only ·5. There was good reason, however, to believe that in recent years that rate had rather increased. Up to 1866 the mortality for England for any one year through the malady had not exceeded 25. In 1866, however, when there was an extensive outbreak of the disease, the deaths arising from it were 36, and when active measures were adopted the number fell in 1870 to 32, but in 1871 it reached the unparalleled number of 56. All persons bitten by rabid dogs did not become infected, though the number who escaped varied. The most recent French statistics gave 40·31 per cent. of the number bitten who were infected, and a previous estimate gave the number at 33 per cent. In Germany, and especially in Austria, the mortality was somewhat higher, and in Bavaria, from 1863 to 1867, 863 persons were bitten, 69 of whom died. Much depended on the susceptibility of the person or animal bitten, and the frequency of the bites. Dogs and cats were most susceptible to the malady; next in order came mankind and pigs; then ruminating animals—the sheep and goat being more susceptible to the disease than the ox. In discussing the question of prevention, Mr. Fleming urged that on all dog licences the symptoms of rabies should be printed, which suggestion had already been carried out in Paris with considerable advantage. He further insisted that those who kept dogs should endeavour to keep them in good health; that all ownerless dogs should be destroyed; and that where dogs became bad tempered, hostile to other animals, and attempted to bite or attempted to escape, they should be secured and kept under strict observation.

The lecture was listened to with marked attention, and Mr. Fleming was frequently applauded. At its conclusion,

The *Rev. Cumming M'Dona* proposed a vote of thanks to Mr. Fleming. He said that there was no disease to which human flesh was subject that was so little understood as hydrophobia, and the community was indebted to Mr. Reilly, the owner of that establishment, for having offered the handsome sum of £500 for the discovery of a cure of such a dreadful disease. The English Government had just offered a reward of £1000 for the discovery of a cure for snake bites in India, and it was certainly undesirable that it should be left to individual enterprise to take up the subject of hydrophobia. (Applause.)

Mr. Harrison Weir seconded the motion, which passed by acclamation.

A vote of thanks was given to the chairman for presiding, and the proceedings terminated.

ON THE FOOD OF STOCK AND ITS IMPURITIES.

Report of a Lecture delivered at the Stowmarket and Central Suffolk Farmers' Club. By Professor Tuson.

Professor Tuson, who delivered an extempore lecture of about an hour's duration, said the subject he had chosen for an address was "The Food of Stock, and its Impurities," and in the term stock he should, to a certain extent, on this occasion include the horse. The subject of food and its impurities had attracted the attention of many chemists and many scientific men of various denominations. It was a most important one in a practical sense, one with which every farmer should be more or less intimately acquainted—the more intimately the better. (Hear, hear.) The subject was so vast that it would be impossible for any one to do full justice to it in the course of an hour's lecture; so what he proposed doing was to speak of linseed cake, point out the characteristics of good and bad, and adulterated cakes, and then to pass on, in compliance with a request from Mr. Sutton, to make some remarks on the subject of kiln-dried oats, having understood that there were many members of the Club who would like to hear some remarks upon this article of food. (Hear, hear.) The plant from which linseed was obtained was grown in various parts of the world, but we derived our chief supplies from India and from Russia. This linseed came into the country in various states of purity. It was generally mixed either with a small or a large amount of foreign seeds. Professor Voelcker had made a determination of the seeds from various parts of the world, and he had found the impurities, such as wild mustard, dodda, &c., to amount from 4 to 50 per cent. Linseed, therefore, sometimes found its way into the market with 50 per cent. of impurities, and this large quantity of impurity was added by dishonest merchants. He (Professor Tuson) would first point out what was the composition of pure linseed, describing the nature of the substances found in the pure seed. This he did accordingly, making frequent reference, by way of explanation, to a statement written in large characters, and hung up in the room. The following is a copy:—

Cakes.

	Pure seed.	High in albumenoids.	Medium in albumenoids	Low in albumenoids.
Moistures	9·01	11·72	11·55	11·71
Flesh-formers—albumenoids .	22·62	32·64	27·91	24·11
Heat and fat-producers:				
Oil mucilage . . .	33·66	12·09	13·20	11·12
Digestible fibre, &c. . .	22·25	25·29	27·22	33·15
Indigestible fibre . . .	8·67	11·79	11·77	12·57
Ash.	3·29	6·47	6·33	7·34
	100·	100·	100·	100·

—There was, he explained, always a quantity of moisture which naturally adhered to all substances of the earth, and then there were found in the seed a number of bodies called albumenoids, white-of-egg-like substances, highly nutritive, from which the growing ox or the growing sheep made its own muscle and its own meat. Then there was the oil and mucilage or gum, the digestible fibre, and the indigestible fibre, a great deal of which would not dissolve in an animal's stomach. The kind of work performed by these substances was to produce in the living animal heat and fat. We often found ourselves and farm stock very warm as compared with the atmosphere. This heat was necessary to the maintenance of life, and it was kept up by the burning in the body of the oil or digestible fibre. Some were burned away, others were stored up in the body. Pigs were frequently fattened by feeding upon rice meal. The chief ingredient of rice meal was starch, and starch was first cousin to gum. It passed into the intestines, underwent absorption, and became transformed into fat. By and by the fat was burnt away, generating the heat necessary to the maintenance of life; directly the burning process ended death ensued. Then there was an ingredient in linseed termed ash. If you took a small portion of seed and experimented upon it, it would be found that nearly the whole of it would burn away, but there was a portion left behind that would not burn, and this was called the ash. This ash, when analysed, was found to contain mineral ingredients such as carbonate and phosphate of lime, showing that in linseed there was mineral matter, necessary to the formation of bone. Professor Tuson explained the figures given above, and proceeded to remark, that in order to convert linseed into cake it was ground to powder, and then put under presses. Sometimes it was previously heated slowly and in a kind of copper. At all events, it was ultimately subjected to pressure, which had the effect of squeezing out some

of the oil, in all, putting it roughly, about two thirds, when it was subjected to intense pressure by the seed crusher. He produced a sample of cake made from good seed, in which the amount of albumenoids was high. It had been carefully and repeatedly examined by the microscope and no foreign impurities could be discovered, yet it was not of the first quality. In the pure cake of first-rate quality there was an agreeable odour and flavour, so that when you smell it you almost regret that you are not a cow to partake of it. (Laughter, and hear, hear.) He warned his hearers never to be deceived by observing whole linseeds sticking on the outside of the cake. Cakes were sometimes made of a most inferior quality, and sometimes mixed with a little linseed which could be seen outside, and in this way the purchaser was often deceived. The cake should consist entirely of crushed seed, and having such qualities that when about an ounce of it was crushed to fine powder and covered with half or three quarters of a pint of boiling water it should form a glutinous matter on cooling, as they would see from the specimen he had before him. (Professor Tuson had three different specimens in an ordinary half-pint tumbler.) Cakes, when mixed with other material, did not show the results which the good cake would do. That which became glutinous on being mixed with water might be used for purposes of food. If a cake was analysed and it contained 27 to 32 per cent., then the oil should be 11 to 13 per cent., and the ash should not exceed about 7 per cent. The cake which belonged to the variety he held in his hand was deficient in odour, and it had about 8 per cent. of ash, and he believed it was made of Bombay linseed and other seeds. Impure cake was produced in a variety of ways. It might be made from unscreened linseed. Many manufacturers did not take the trouble of screening their seed. They even went so far as to buy siftings from other persons, and added them to the linseed before it was crushed into the cake. He showed the gentlemen present a specimen of an impure cake partly made from siftings. If smelt and tasted, it would be found to be different altogether from the other specimen. Though this cake was kept in a dry room, it had become mouldy, a condition most dangerous to cattle. In all probability the mould would be productive of the greatest possible injury, and even death. Very often the veterinary surgeon was puzzled to account for the death of animals, and had often to attribute the death of animals to the food given to them. Very often various kinds of cakes were sent for analysis, and if kept a little while turned mouldy, and he had no doubt but that this kind of linseed cake was often productive of injury to the animal. In the specimen he had before him there was a "P" stamped on it, a mark intended by the maker to show to

the buyer that the article was pure, and yet it was one of the dirtiest cakes he had seen, and was an instance of the manner in which farmers were cheated by merchants and other persons. (Applause.) Many of the seeds mixed naturally with the linseed, and which were added purposely, were perfectly harmless. But sometimes it happened that they were exceedingly poisonous. Linseed cakes had been met with in which it was easy to detect castor beans, the seed from which castor oil was made. Such cakes were intensely poisonous. It frequently happened that wild mustard was mixed with the linseed, but not in large quantities. Most of us know what the effect of an application of a mixture of mustard and water is to the flesh; and mustard and water was the common plan for making people sick. Therefore it would be easy to understand what would be the effect of an ingredient of this kind upon the stomach of an animal. If given in large quantities it would produce death. Some years ago a farmer sent him a cake, stating that it had been bought for pure linseed cake. On examining it he (Professor Tuson) found it to consist almost entirely of mustard, retaining a considerable quantity of the meal of the seeds. The farmer lost a number of sheep, and the death of the animals was to be attributed to the mustard, of which the cake was composed. Mustard in cake might be detected by the bitter and biting which was imparted on tasting it. Another way of detecting mustard was mixing the cake in a little warm water, and if the mustard was present in tangible quantity there would be emitted in a few minutes the pungent smell with which we are all familiar. Another substance which was often mixed with ground linseed and converted with it into cake was bran. There was nothing hurtful in bran itself to the animal, but there was something hurtful to the farmer if he paid the same price for it he would for pure linseed cake. Pure linseed contains no starch; if starch be found in linseed cake it points to the probability of bran or pollard being used as an adulterant. Bran was frequently added because of its cheapness. Professor Tuson experimentally illustrated the manner in which the presence of starch in a cake could be discovered, and in continuation he said he had been asked by the Chairman if he had ever discovered saw-dust in linseed cake? He (the lecturer) might say that sometimes mahogany dust was applied (hear, hear); and if he were to stop to give a description of all the ingredients which were found in some cakes he should tire the patience of his hearers. However, as he had said, if starch was found in linseed cake it might be known that it did not exist there naturally. Sand and dirt swept up in warehouses, and containing nobody knew what, were often mixed in the cake. These

sweepings very often contained poisonous substances, sometimes saltpetre, sal ammoniac, and even sometimes arsenic. These sweepings were brought together and made up into feeding material, and in this way it would be understood how numberless impurities, sometimes highly noxious, found their way into linseed cake. A corndealer in Essex once told him that he was commissioned by some seedcake makers to buy up any seeds he could, provided they were cheap. There was no doubt that certain grave evils existed in relation to the purity of feeding stuffs; had the farmer no remedy for these evils? His strong advice to farmers was that if they did not want to be cheated they had better go to the honest cake maker—there were some—and if they did not know a good honest seed crusher, let them take a little pains to find one out. They must be prepared to pay the full market price for the article. If they attempted to buy that which appeared to be a bargain, they must examine it or have it examined first, or nine times out of ten they would be cheated. There was another exposure which he must make, and that was the difference between the meaning of the terms "pure" and "genuine" as applied by the trade. The pure cake was made from sifted linseed, and genuine cake was made from linseed as imported. It might contain from 40 to 50 per cent. of impurity. If they bought a cake without a guarantee as to its quality, any action in law afterwards would fall to the ground. He remembered a case in which a farmer brought an action against a merchant, the farmer having bought the article which was called genuine cake. The Professor found it contaminated with bran, and the action failed because there was no guarantee, and the farmer had to submit to a nonsuit. It must be very gratifying to farmers to know that adulteration was not so extensively employed as it was a year or two ago. He (Professor Tuson) thought this better state of things was due to the energy displayed by the Royal Agricultural Society, which had been instrumental in exposing certain articles which had been offered to the community. He considered the agricultural community owed the Society a debt of gratitude for having taken such a bold step. (Applause.) Complying with what he believed to be the desire of several members of this Club, he proposed to say something about kiln-dried oats. Most of those present knew, either from their own experience, or from the experience of their friends, that kiln-dried oats had the effect of producing a good deal of harm amongst horses. It caused a profuse staling and falling off of the flesh, preceded by indigestion. He thought the explanations hitherto given of the cause of these effects were only partially true. He had a theory of his own, which was founded to a certain extent on facts. What was meant by kiln-

drying? And why were oats kiln-dried? Oats were frequently damaged by water, either on board ship or in some other manner, and these oats before they were again marketable must have the water removed from them. This was accomplished by spreading them over the floors of rooms, such floors being perforated so as to admit a current of hot air through them. This is kiln-drying, and does not, in the lecturer's opinion, render oats injurious to health. But it often happens that in kiln-drying the oats have been heated so high as to brown them, or they have become mouldy. In order to restore the over-dried oats to their proper or saleable colour, or to kill the fungi, the cause of the mould, it was customary to "doctor" or sulphur them, which consisted in subjecting them to the gas arising from the burning of sulphur or brimstone. He considered it very probable that the outcome of any investigation that might be taken upon this subject would be to show that the sulphuring was at the bottom of the mischief. (Hear, hear.) Sulphuring had the effect of removing the colouring matter, and bringing back the white colour of the oat. The oats thus treated were almost unnaturally white. Many persons would be able frequently to tell by the eye whether the oats had been sulphured or not. They must never buy, if they knew it, sulphured oats, for if the sulphuring did not render them injurious, yet they would know that the oats had previously been in a damaged condition; and if they will buy them, they must be prepared to get an article which might be injurious to the animal. The mould might be still lurking in the oats, and when in the stomach of the animal might grow and develop itself, and do much harm. He had known instances of this mould killing animals. He remembered that some years ago Professor Varnell was consulted by a farmer who had lost three horses. The oats and provender were examined by other chemists as well as by himself (Professor Tuson) by the naked eye as well as by the microscope, and they found a mushroom or mouldy kind of growth on the oats. On making a close examination of the oats they found them diseased; and they came to the conclusion that this mouldy fusty substance was the cause of the death of the animals fed upon the oats. They gave some of the oats to another horse, and that also died. They also gave some of the minute spores or seeds and germs of the fungus to a rabbit, and that died. He thought that in many instances the injuries attributed to kiln-dried oats were really due to the vitriol or sulphuric acid adhering to the sulphured oats, and which resulted from the chemical combination of the gas emitted by the burning sulphur (sulphurous acid) with moisture and atmospheric oxygen. He had examined ten samples of sulphured oats and compared them with ten samples of unsulphured, and he found

no sulphuric acid adhering to the latter, whereas in the other he detected this agent. After contending that sulphuric acid, and not mere kiln-drying, was probably the cause of the mischief in most instances, Professor Tuson quoted Dr. Copland's remarks upon the subject, and, in conclusion, said he should like some gentleman present to try the effect of the use of sulphured oats on an old horse, and carefully watch the result, in connection with some veterinary surgeon. It would be an exceedingly interesting study, and might be productive of good results.

Analysis of Continental Journals.

By G. Fleming, M.R.C.V.S., Royal Engineers.

NOTE ON THE DEVELOPMENT OF A SMALL UNARMED TAPE-WORM IN THE HORSE'S INTESTINE, AND ON THE SERIOUS CONSEQUENCES RESULTING THEREFROM.

M. Mégnin, an accomplished veterinary surgeon in the French army, and who, for several years, has devoted considerable attention, and with excellent results, to the parasites of the domesticated animals, in a paper read before the Central Veterinary Society of Paris, describes a small unarmed tapeworm of the horse, and the injurious effects it produced. He refers to the researches and experiments of Van Beneden, Küchenmeister, Siebold, Leuckart, Haubner (Dresden Veterinary School), and Baillet (Alfort), who have furnished science with valuable facts relative to the different phases in the development of the armed tapeworms, and the migrations of these in the various animals in which they exist successively as parasites. It is not so, however, with the unarmed tapeworms; for with the exception of the *Tænia mediocanellata*, which lives in a larval condition in the bovine species before it becomes a human parasite, they are only known as *Strobilæ*, nothing being ascertained as to the cysticerci from which they are produced, or in what animals their scolices are to be found, if so be they live in the different animals. Everything written on this subject is to be found in the following extract from the *Zoologie Médicale* of Gervais and Van Beneden:—"It is a long time since a very distinguished man, speaking of these worms, told us that the *Tænia plicata*, which is derived from the intestines of the horse, may become the *Cysticercus fistularis* in the

abdomen of the same animal." On the other hand, we read in the remarkable article on 'Helminths,' by Baillet, in the *Nouveau Dictionnaire* of Bouley and Reynal (p. 649): "If it is indispensable that the tapeworms have at first lived as scolices in an organism other than that in which they are usually found, and if it must happen that an herbivore has been the prey of a carnivore in order that the scolex should be transported into the intestine where it may be transformed into a strobila, how is it that we frequently meet with tapeworms in the intestines of the herbivora, such as the horse, ox, and sheep, which are not in the habit of feeding on living or dead creatures? Up to the present time there are no direct observations which could solve the question in an absolute manner. Some authorities think, though without its being demonstrated, that the unarmed tapeworms—as those of the herbivora—enter the body with the water they drink. We may nevertheless believe that some at least of these parasites are destined to undergo their metamorphoses and accomplish their migrations as completely as those of the carnivora; for in the ova their embryos (those of the *Tænia perfoliata*, for instance) are provided with hooklets which should serve them as organs of locomotion. It remains to determine into what species of animals the proscolex enters, and how the scolex which results passes into the intestine of an herbivore. At present this has not been done; but without saying anything positive in this respect, we may add that it is not impossible that the proscolex has the power of living first in certain insects or other inferior creatures, and that these are accidentally swallowed by the herbivores with their natural food; for, as M. Jolin has observed in his *Traité de Physiologie:* "Our cattle eat without repugnance the locusts which devastate the fields towards the end of autumn, and it may be added that other insects are also ingested." Thus, with regard to this question, everything is hypothetical.

The remarkable case, in a clinical point of view, observed by Mégnin will, he thinks, if it does not resolve the question completely, at least throw a new light upon it. It is as follows:—On April 19th, 1872, a horse, four years old, which had been three months in his regiment, died in the infirmary after six hours' most agonising suffering, due to acute peritonitis. An examination made immediately after death revealed these lesions: Redness and injection of the peritoneum, particularly in the peri-visceral portions; serous effusion, to the extent of more than two gallons, of a muddy, yellowish-brown colour, containing pseudo-membranous pale

green clots, and a large quantity of *alimentary matters*, indicating a communication of the digestive tube with the peritoneal sac. Indeed this had been expected, for about ten minutes before death the animal had regurgitation and ejection by the nostrils of the food which it had previously eaten. To Mégnin's great surprise, however, the stomach was intact, though much loaded and distended; but the cardia was relaxed, and on opening the œsophagus a quantity of gas escaped from the stomach. Carefully exploring the small intestine from the duodenum to the ileum, in the latter some curious lesions were noted. First, there was a longitudinal tear nearly three inches in length, extending to near the ileo-cæcal termination (A, fig. 1, in the accompanying plate); at the borders of this opening false membranes adhered, mixed with a greenish chymous matter, indicating that it was by this rent that the food floating in the abdominal cavity had escaped. Alongside this opening, close to the attachment of the mesentery, were found, close to each other, two tumours of nearly equal size (B B, fig. 1); these were soft and elastic, and felt empty; they were about three-fourths of an inch in diameter. The portion of the ileum in which these alterations were observed was remarkable for its consistency and rigidity, resembling, as it did, that of the œsophagus in the vicinity of the cardia. On opening the intestine, the cause of this consistency was accounted for by its walls being found quintuple their ordinary thickness, the muscular tunic being the seat of hypertrophy (fig. 2). The ileo-cæcal valve was also considerably thickened, and the calibre of the small intestine almost obliterated. But the most striking feature was a crowd of small flat worms of various sizes, attached to the mucous membrane; so numerous were they that fifty-three were counted on a space scarcely a foot in length. At an inch and a half from the ileo-cæcal valve was found the opening corresponding to the external rupture (A); this was remarkable for its small size, when compared with the latter, being only about half an inch in length in its ordinary state, but it could be much increased by passing the fingers through it; the mucous membrane surrounding it hung through in long shreds. Alongside the principal opening (A) were remarked two small smooth infundibuliform cavities (B B) into which the finger could scarcely penetrate, and which led to the two tumours already mentioned. In everting these like the fingers of a glove, it was found that they were lined with a reddish mucous membrane similar to, and continuous with, that of the intestine. Each tumour contained about a dozen

worms, the same as, but smaller than, those adhering to the mucous membrane of the ileum.

In seeking to account for the manner in which the intestine was torn, and which was the cause of the peritonitis that resulted in death, it was recognised that at the seat of rupture there had been a cyst similar to those yet remaining, but probably of larger dimensions; the shreds of mucous membrane protruding between the lips of the rent were a proof of this. This cyst, after the worms it contained had left it, remained a kind of bag or "crop" in which the alimentary matters accumulated to such a degree as to cause its walls to give way. This accumulation was assisted, or even induced, by the morbid constriction of the terminating portion of the ileum, which hindered the movement of the intestinal matters; and this constriction and hypertrophy of the walls of the ileum had been caused by the continual irritation produced by the presence and development of the cysts.

The animal which had furnished this curious autopsy appears to have been the victim of a veritable verminous infection or diathesis; for in carefully exploring the different nooks in the intestinal tube in search of the small tapeworms, there were found in succession—1. In the stomach, about *two hundred bots*. 2. In the small intestines, one hundred and fifty-three ascarides (*Ascaris megalocephala*). 3. In the cæcum, four to five hundred oxyures (*Oxyuris curvula*). 4. Finally, in the last portion of the large colon, several thousands of the armed strongle (*Sclerostoma equinum*), imbedded in the mucous membrane in such a manner as to make it look like an immense hedgehog skin dyed a red colour. So numerous were these various parasites, that Mégnin filled a litre (nearly a quart) jar with them, and yet several more might have been filled.

Until the earliest symptoms of peritonitis appeared, the animal had not betrayed any sign of being so infested.

Mégnin asks what was this worm which, notwithstanding its smallness and the absence of hooklets, had occasioned such serious consequences. It was evidently a helminth belonging to the cestode class, as was evidenced by its tapeworm like shape, its being divided into numerous rings, and its tetragonal head with four suckers (fig. 4). The absence of a central proboscis (*rostellum*), surrounded by hooklets, allotted it to the third section—that of the *unarmed tapeworms*—of Baillet. The determination of the species was not so easy, for neither in the works of Dujardin, Gervais and Van Beneden, nor in that of Davaine, is any specific description given which

is quite applicable to it. It was evidently allied to the *Tænia perfoliata* of Goeze, the *Tænia plicata* of Rudolphi, and the *Tænia mammillana* of Mehlin; but it was more closely related to an unnamed species described by Baillet, and found by him in the large intestine of a mule. The following is the description given by Baillet:—

"*Tænia* . . .? A worm 6 to 7 centimètres long. Head tetragonal and somewhat thick, $2\frac{1}{2}$ to 3 millimètres broad, with four appendages, two on each side, extending backwards, and resting on the first rings. Four somewhat prominent circular suckers, very deep in the centre. Neither proboscis nor hooklets. Body 4 to 5 millimètres wide behind the head, and then suddenly increasing until it attains to 14 or 15 millimètres, a width it maintains throughout the remainder of its extent; very finely denticulated like a saw along its borders, and formed by rings which look as if applied one against another like the leaves of a book, only adhering to each other on a median line, transversal to the larger axis of the worm. Each of the posterior rings, detached and laid flat, is elliptical, 14 millimètres in the direction of the worm's width, and 4 to 5 the other way. Its median part is occupied by a simple uterus, elongated towards the larger axis of the ring, and terminates near each of the borders by a very acute angle. Each ring is only provided with one testicle formed by a vesicle whose *cul-de-sac* is turned towards the centre of the ring, and whose other extremity becomes a minute tube which is bent at its origin, then returns towards the margin of the ring and enters a somewhat long tube of larger diameter; this again gradually tapers until it terminates in a penis. Ova irregularly cuboid, angular, and having a diameter of 0mm. 063 to 0mm. 072."

Mégnin's tapeworm, apart from the size and the sexual organs, which it did not possess, had all these characters. Its head was the same, though slightly smaller, and was furnished with the same appendages (fig. 4). Its rings were the same in form and arranged in the same manner; they were 60 to 80 in number, according to the size of the parasite examined, the size itself varying from 5 millimètres to 2 centimètres. The rings, squeezed until they were completely transparent, only showed a fleshy amorphous mass like sarcode (fig. 5, A, B), without any trace of ovaries or testicles. This seemed to prove that this tænia, although already in the shape of a strobila, was yet very young and had scarcely got beyond the degree of a scolex. This might be the reason for its small size compared with that described

by Baillet, which was an adult worm. Therefore everything was in favour of the identity in species of the two worms.

But what neither Baillet nor any of those who have studied the unarmed cestoid worms observed—the point of origin of these parasites—Mégnin was able to note. All his small tapeworms came from peri-intestinal cysts, which still contained them, and these cysts were certainly nothing more than the dwellings of the polycephalic scolices which produced them. Mégnin uses the term *Polycephalic scolex*, as implying something like an *Echinococcus* or a *Cœnurus*, because the same cyst yielded a large number of *Strobilæ* and not a *Cysticercus*, which being monocephalous can only give origin to one worm.

Mégnin did not hesitate to give an opinion as to what he thought was very probably the mode of development of, and the various phases passed through by, this species of unarmed tænia. The ova deposited by the proglottis of the worm either on the herbage or in the water of ponds, or the common and very filthy watering-places of pastures, with the fæces of herbivorous animals pasturing and drinking therein, are swallowed along with the food or drink by animals of the same species as those which furnished these proglottides. The ova, on arriving in the small intestine, are hatched, each giving issue to a proscolex, probably armed like that of the *Tænia perfoliata*, which burrows into the mucous membrane either by means of crotchets or the glandular canals, passes through the muscular tunic and remains on its surface, or even in its texture, as was shown in one of the cysts (c, fig. 2). There the proscolex becomes a vesicle in which are developed numerous scolices; these, as they become mature, pass into the condition of strobilæ and return to the intestine, there to fix themselves and undergo the last phases of their evolution. It is also probable that the path pursued by the proscolex remains open, and that the young unarmed tapeworms follow it to reach the intestinal canal; their repeated journeyings maintain and enlarge the fistula, which may ultimately afford an entrance to the alimentary matters. It is even possible that the persistence of this fistula is necessary to the development of the scolices, and that it is through its disappearance that the worms contained in one of the cysts examined by Mégnin were dead. In opening this cyst, only a quantity of white, pultaceous, and amorphous matter containing a great number of cells was found, this being similar in every respect to that observed in the other cysts, but in these it was mixed with living worms and vegetable *débris* from the intestines.

Fig. 1.

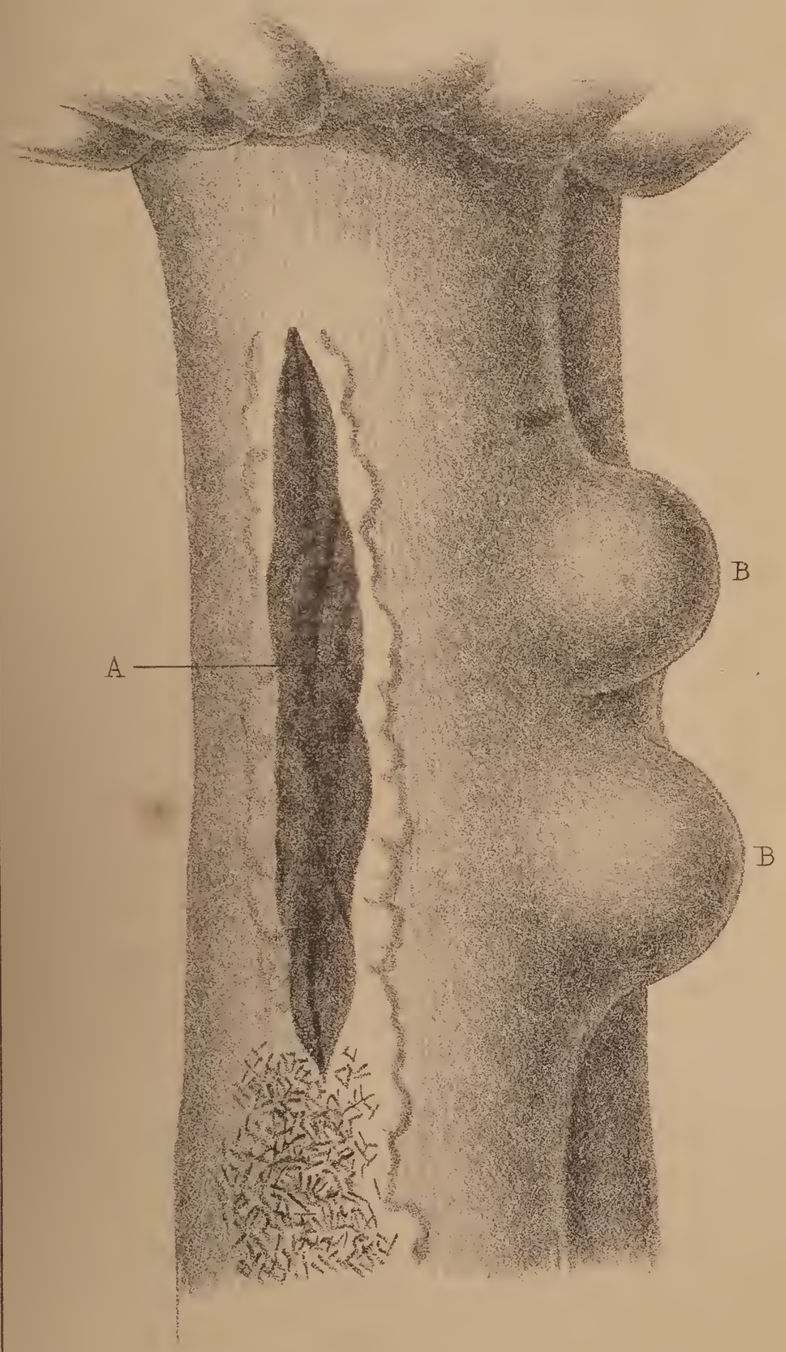


Fig. 2.

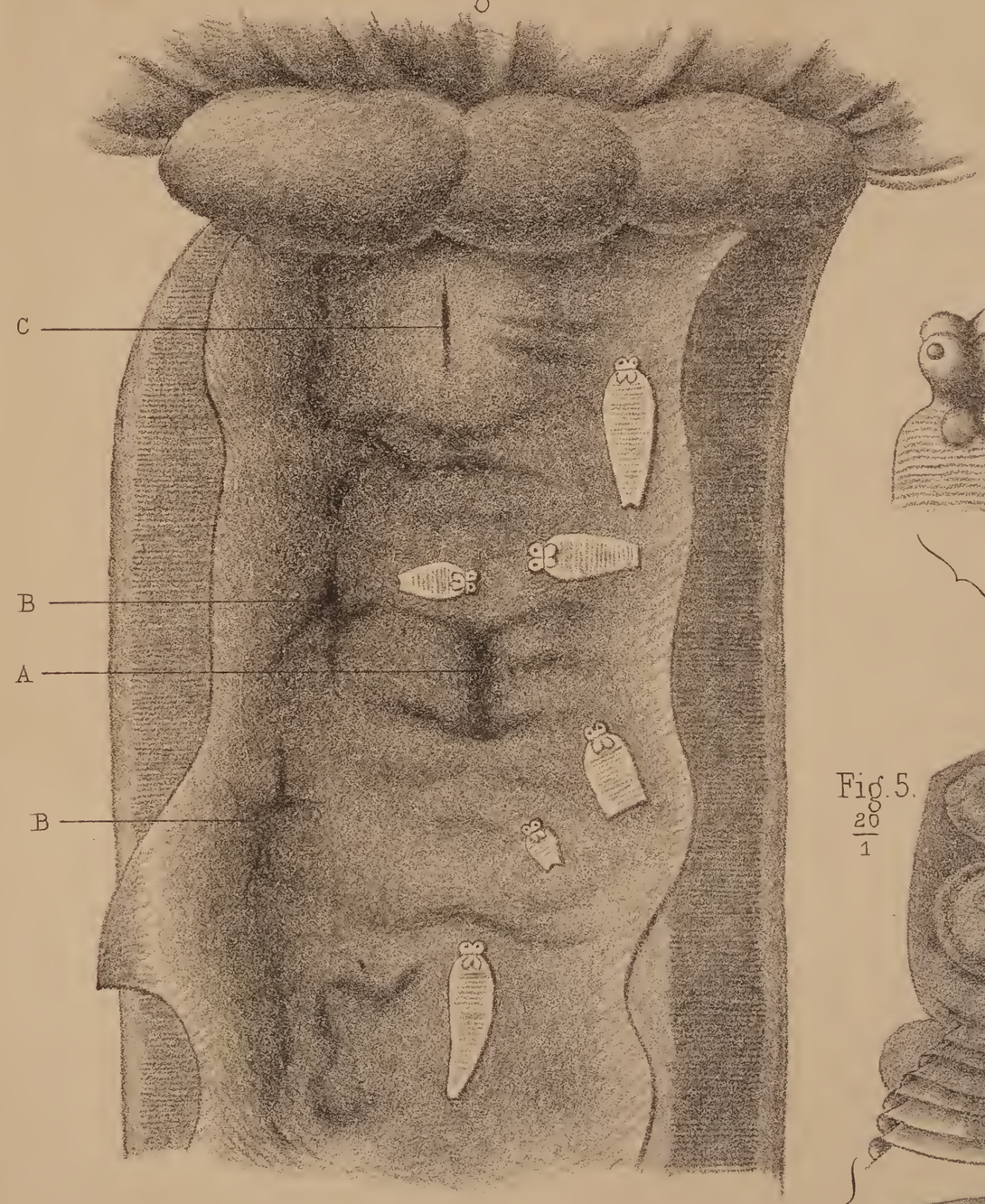


Fig. 3.

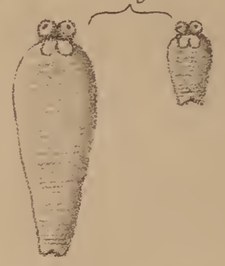


Fig. 4.

$\frac{5}{1}$

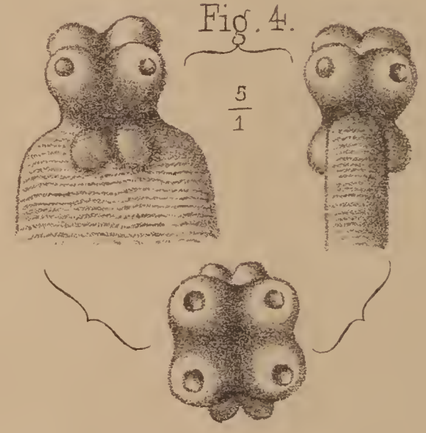
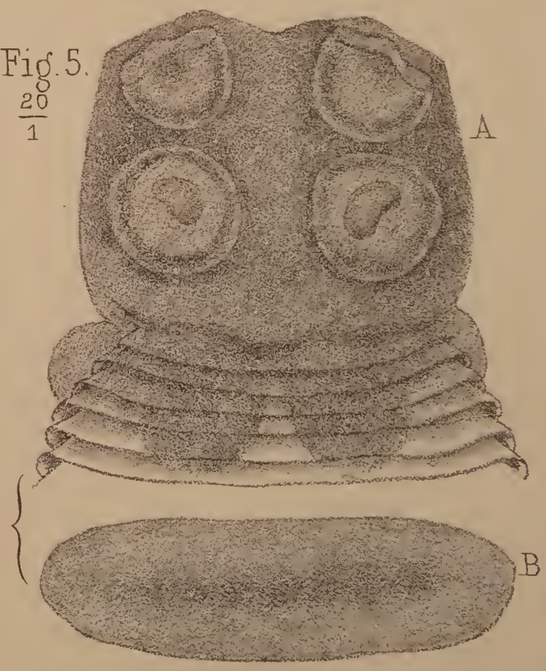


Fig. 5.

$\frac{20}{1}$



Petit Tenia inerme du Cheval.

In this way Mégnin endeavours to explain, that without the intervention of any insect or other creature of a different order, the development and multiplication of the unarmed tapeworm in the larger domesticated herbivora are effected. This view partly justifies the assertion of the interlocutor of Gervais and Van Beneden, "that the horse nourishes at the same time the strobila and scolex of the unarmed tænia." Mégnin's observation, however, in so far as his small tapeworm is concerned, does not admit of the intervention of a cysticercus.

This interesting paper is accompanied by drawings of the intestine at the point of rupture, the cysts, and the helminth, a copy of which we give.

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING OF COUNCIL, HELD ON WEDNESDAY, JULY 8TH, 1874.

PRESENT:—The President, E. C. Dray, Esq., in the Chair; Messrs. J. C. Broad, Harpley, Field, Mayer, Balls, Naylor, Moore, Pritchard, Cheesman, Withers, Woodger, and the Secretary.

The minutes of last quarterly meeting and of the special meeting held on the 2nd June were read and confirmed.

Correspondence.

Letters were read from Professor Brown, dated 6th July, regretting his inability to attend the meeting, and expressing his appreciation of the vote of thanks accorded to him at the last meeting of the Council.

Also from the following Vice-Presidents, acknowledging the honour of their election:—Professor McCall, Messrs. J. J. Cheesman, H. J. Cartwright, Wolverhampton; E. Naylor, Wakefield; T. W. Mayer, Tongham; and S. H. Withers, who also acknowledged his re-election as Treasurer to the Royal College of Veterinary Surgeons.

The Secretary intimated that Dr. Augustus Voelcker had presented three pamphlets to the Library of the College.

On the motion of *Mr. Naylor*, seconded by *Mr. Broad*, a vote of thanks was unanimously accorded to Dr. Voelcker.

Examinations in Scotland.

A letter was read from Dr. Dunsmure, dated 21st April,

1874, in reference to the examinations held at Glasgow and Edinburgh, on the 15th, 16th, and 17th of April.

The Secretary read the report of the Scotch section of the Court of Examiners, from which it appeared that at an examination held in Glasgow, on the 15th of April, six candidates passed and one was rejected. On the 16th, of ten candidates from the New Veterinary College, Edinburgh, eight passed and two were rejected. On the 17th April, at Edinburgh, five candidates passed from the Veterinary College; and of four candidates from the New Veterinary College, three passed and one was rejected; making a total of twenty-two passed and four rejected.

Examinations in London.

A letter was read from the Principal of the Royal Veterinary College, dated June 20th, stating that forty-three candidates would present themselves for their first examination on July 1st and following days.

Also a letter from the Chairman of the Board of Examiners, approving the time named for the examinations to be held.

The Secretary read the report of the meetings of the Court of Examiners, held in London, on July 1st, 2nd, 3rd, 4th, and 6th. Of forty-three students who presented themselves for their first examination, thirty-one passed and twelve were rejected.

A letter, dated 24th June, from Dr. Dunsmure was read, in which he stated that the number of students coming up for examination were: nineteen fromGlasgow, twenty-six from the new Veterinary College, Edinburgh, and ten from the old Veterinary College. The examinations would not take place before July 21st or 22nd, in consequence of the professional engagements of the examiners requiring their attendance in London. He asked for diplomas to be sent, in order to obtain the signatures of the examiners, after which they would be returned to London.

Mr. Naylor was of opinion that it was a most unusual thing to give the signatures to blank diplomas.

The Secretary said that, in order to meet the question, the same plan could be adopted as had been done in England, namely, that if the pass examination took place on the first day, then on the second day, or whatever day it might be, the signatures of those examiners who might not have been present at the pass examinations could be obtained.

Mr. Mayer asked if there was any diploma issued until after the final examination.

The Secretary said there was not.

Mr. Mayer asked upon what principle, then, the diplomas could be sent.

The Secretary said they could not be sent: it would be a deviation from the rules of the College.

Mr. Mayer said he thought the Secretary ought to inform Dr. Dunsmure, that no diploma, or even certificate, was given at the first examination, and that the diploma was only issued when the examination was completed.

Mr. Moore thought there must be some mistake.

The Secretary said that there was no mistake. The difficulty was that in Scotland many of the examiners were resident forty or fifty miles from each other; and when they finished their examinations they went away; and if the pass examination took place after the first examination, the diplomas had to be sent after them for signature.

Mr. Naylor said his impression was that they should all be signed by the chairman on the part of the Board generally.

Mr. Pritchard did not approve of that course being adopted. He thought it would not be suitable.

Mr. Mayer said that students generally wished the signatures of those who examined them attached to their diplomas.

Mr. Moore asked if the same examiners would be present at the final examination.

The Secretary said that there would only be part of them —two or three. If the plan that he proposed was adopted, of having the pass examination first, then the signatures would be secured, as the diplomas were left in his care to obtain the signatures.

The Secretary was instructed to write to that effect.

The Secretary stated that he had received a letter from Professor McCall, in which he desired to be informed as to the shortest period in which a licentiate of the Royal College of Surgeons (Ireland) could present himself for the diploma of the Royal College of Veterinary Surgeons.

The Secretary was instructed to write to the effect that it was a question for the schools to deal with, and that the Council had nothing to do in the matter.

Election of Registrar.

It was proposed by *Mr. Harpley*, and seconded by *Mr. Naylor*, "That Mr. Coates be re-elected Registrar."

On the ballot being taken, Mr. Coates was declared to be unanimously elected.

Appointment of Committees.

Finance Committee.

The following gentlemen were re-elected members of this Committee:

Messrs. J. C. Broad.
" W. Field.
" Harpley.
" Moon.
" Wilkinson.
" Withers.

It was moved by *Mr. Mayer*, and seconded by *Mr. Balls*, "That the name of Col. Sir H. Fitzwygram be added to the Committee."

Publication Committee.

Professor Brown and Mr. Fleming were re-elected members of this Committee.

On the motion of *Mr. Broad*, seconded by *Mr. Mayer*, it was resolved that Mr. J. R. Cox be elected in the place of Mr. Lowe.

House Committee.

The members of this Committee, consisting of Messrs. Balls, Broad, Harpley, and Withers, were re-elected.

On the motion of *Mr. Naylor*, seconded by *Mr. Woodger*, it was unanimously resolved that the name of Col. Sir F. Fitzwygram be added to the number.

The Parliamentary Committee,

consisting of Professor Simonds, Messrs. J. C. Broad, G. Fleming, W. Field, Gowing, Harpley, and Wilkinson (with power to add to their number) was re-elected.

College Fund Committee.

The previous members, Professor Brown, Messrs. Balls, Broad, Gowing, Harpley, Field, and Mayer, were re-elected.

It was moved by *Mr. Moore*, and seconded by *Mr. Naylor*, and resolved, that Col. Sir F. Fitzwygram be elected as an additional member of the Committee.

Alteration of Hour of Meeting.

Mr. Mayer, pursuant to notice previously given, called attention to the time occupied by the preliminary business at the quarterly meetings, and moved that the hour of meeting should in future be 4, instead of 5 o'clock.

Mr. Broad seconded the motion.

The Secretary pointed out that none of the professors, who had a difficulty in attending even at 5 o'clock, were present. He did not think that an earlier hour would suit some of the country members.

The motion, on being put to the meeting, was carried unanimously.

Publication of Names of Voters.

Mr. Mayer then moved another resolution, of which he had given notice:

"That the names of members of Council voting in the resolutions proposed at the meeting be published with the minutes." He said it was customary in most corporations to show how the members voted on any important motion, and it was only just to the profession which they represented to show whether or not they fulfilled their duty in carrying out its interests.

The Secretary asked if Mr. Mayer meant that the names of members should be inserted in the Secretary's minutes or in the report taken by the reporter for the *Veterinarian*.

Mr. Mayer said he meant the Secretary's report.

Mr. Naylor said that, in that case, the motion would be useless, as the Secretary's minutes were not seen by the public. If it was sought to make the names of voters public they should rather be inserted in the report which was made public through the *Veterinarian*.

The President pointed out that many of the votes were by ballot, and in that case it would be impossible to publish the names.

Mr. Mayer said that there were votes taken in many instances which were not by ballot. It was only on imporant motions that he would wish the names of the voters to be published.

The President called attention to the fact that the motion had not been seconded, and that it was unusual to allow a discussion on any motion that had simply been proposed.

Mr. Moore said he would second the motion in order to allow its being further discussed.

Mr. Naylor said that Mr. Mayer's motion had probably reference to some remarks that took place at the annual meeting. There were several gentlemen who made it a point to know what the several members of Council did. In the report of the *Veterinarian* the names of the members who voted on any particular question might be given, but it would not be necessary to record them in the Secretary's books.

That was all Mr. Mayer meant by his motion, and if it were done it might satisfy the public.

Mr. Harpley said there would be a difficulty in deciding what were important and what were unimportant motions. If the names were to be published at all they should be given on every division that took place in the Council.

Mr. Pritchard said that all the discussions were published in the *Veterinarian*, and that gave the public a good idea of how the members voted.

On being put to the meeting the motion was lost.

The obituary notice was read.

It was moved by the *President*, and seconded by *Mr. Pritchard*, and resolved, "That a letter of condolence be sent to Mrs. Lepper and family."

The Registrar reported that 250 copies of the new Register had been received from the printer.

Finance Report.

The report of the Finance Committee and the Treasurer's quarterly balance-sheet were read, from which it appeared that the present liabilities amounted to £106 15*s.* 2½*d.*, which the Committee recommended should be discharged.

It was moved by *Mr. Mayer*, and seconded by *Mr. Naylor*, and unanimously resolved, "That the finance report and Treasurer's balance-sheet be received and adopted."

Cheques were ordered to be drawn to meet current expenses.

College Fund.

The College Fund Committee reported that since the last meeting of Council the sum of £12 17*s.* 6*d.* had been received towards the College Fund. The balance at bankers' amounted to £752 6*s.* 7*d.*, which, together with the sums already promised, would make a total of £989 18*s.* 7*d.* The Committee, acting on the instructions of the Council, had prepared a circular to be issued to such members of the profession as had not yet subscribed towards the College Fund, and which they now submitted for approval.

It was resolved that 2000 of the circulars be printed and issued.

The Secretary was instructed to issue a circular as a reminder to those subscribers who had promised, but not yet paid in, their subscriptions.

The Council then adjourned.

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

A QUARTERLY meeting of the above Association was held at the Blackfriars Hotel on July 1st, W. A. Taylor, Esq., President, in the chair. The following gentlemen were present:—Messrs. Greaves, Hopkins, Faulkner and Roberts, Manchester; Reynolds, Liverpool; Bunnel, Oldham; Lawson, Bolton; A. Challinor, Bolton; J. B. Taylor, Ashton-under-Lyne; W. Challinor, Worsley; Lomas, Stockport; Ferguson, Warrington; Woolner, Heywood; J. Taylor, Oldham; and Lowe, Bolton.

Minutes of the last meeting were duly confirmed and letters of apology for non-attendance were read.

Mr. Bunnel, of Oldham, and Mr. C. J. Challinor, of Worsley, were unanimously elected members of this Association.

The President said he regretted to have to bring before the meeting the case they had to consider this evening, and hoped that each member would state his views calmly and candidly.

Mr. J. B. Taylor, of Ashton-under-Lyne, complained that Mr. Greaves, of Manchester, had been guilty of a breach of professional etiquette, in that he had instructed the Lancashire and Yorkshire Railway Company at Ashton to employ Mr. Crook, who is a non-qualified man, in cases of emergency, instead of Mr. J. B. Taylor, who had hitherto attended to all urgent cases without a single complaint since Mr. Greaves had taken the contract for the whole county.

Mr. Greaves said that he felt himself placed in a very disagreeable position; he should be sorry to give offence to any gentleman, and those who knew him best knew that to be a leading feature in his character. It was the Lancashire and Yorkshire Railway Company's wish to change, and not his desire to do so. He asked them to employ the other member of the Royal Veterinary College that was in Ashton, but they would not countenance him.

After considerable discussion on the matter, *Mr. Greaves* said, "Seeing the animus which prompts many of you, before any further proceedings are taken I tender my resignation." This was unanimously accepted.

Mr. W. Challinor proposed that, on account of the lateness of the evening, Mr. Lomas's paper be postponed until next evening with his consent. *Mr. A. Challinor* seconded the motion.

A vote of thanks to the president for the kind, gentlemanly, and courteous manner in which he had filled the chair brought the meeting to a close.

M. J. ROBERTS, *Hon. Secretary.*

STUDENTS WHO HAVE PASSED THEIR FIRST EXAMINATION.

Royal Veterinary College.

At the several Meetings of the Court of Examiners of the Royal College of Veterinary Surgeons held on July 1st, 2nd, 3rd, 4th, and 6th, the following students from the Royal Veterinary College passed their "First Examination."

July 1st.

Mr. George South.	Mr. John Henry Steel.
„ Albert Richard Charles.	„ William Henry Jones.
„ Joseph Henry Irish.	„ George William Carter.

Mr. George Garnett.

July 2nd.

Mr. George Farrow.	Mr. Thomas Williams Whitney.
„ William Robert Hagger.	„ Frank Lane Smith.

Mr. Henry Baker.

July 3rd.

Mr. Jn. Holmer Harrison Peard.	Mr. Frank Taylor Oatway.
	„ George Burton.
„ Charles James Reynolds.	„ George Bailey.
„ William Garton Dixon.	„ Thomas Robert Williams.

July 4th.

Mr. Thomas Leather.	Mr. William Asbey Hurrell.
„ William Edwin Taylor.	„ James Frederick Oliver.

Mr. Charles Mullett Stapley.

July 6th.

Mr. Richard John Verney.	Mr. Walter Seymour Bontoft.
„ David Morrison Storrar.	„ John Stenson Barber.
„ John Blakeway Wolstenholme.	„ Henry Durant Gibbings.
	„ William Vessey.

At the meetings of the Scottish section of the Court of Examiners of the Royal College of Veterinary Surgeons held in Edinburgh on July 20th and 21st the following students of the Edinburgh Veterinary Colleges passed their "First Examination:"—

Edinburgh Veterinary College.

July 20th.

Mr. John Jones.	Mr. James Shivas.
„ Edward Thomas.	„ George Geddes Tait.
„ Israel Print.	„ James Cowie.
„ William McGuire.	„ Wm. Earle McCracken.

NEW VETERINARY COLLEGE.

July 20th and 21st.

Mr. Robert Knight.	Mr. Richard Roberts.
„ John Nettleton.	„ John William Marsland.
„ Robert Moore.	„ William Barnes.
„ William Moodie.	„ John Johnstone.

At the meetings of the Court of Examiners of the Royal College of Veterinary Surgeons held in Glasgow on July 22nd, the following students passed their "First Examination:"—

GLASGOW VETERINARY COLLEGE.

July 22nd.

Mr. Robertson Muir.	Mr. James McParlane.
„ James Prentice.	„ Daniel Murray.
„ William Semple.	„ Hugh Sim.
„ John B. Moore.	„ Charles D. Ashworth.
„ Thomas Giffen.	„ John Bryce.
„ John Cunie.	„ George Ferguson.
„ Alexander R. Simpson.	„ George H. Elder.
„ John Jarvie.	„ John Sinclair.

PARLIAMENTARY INTELLIGENCE.

IMPORTATION OF FOREIGN CATTLE.

HOUSE OF COMMONS—*July 21st.*

Mr. W. E. Foster asked the Vice-President of the Council whether he could inform the House if the Government had any arrangement in progress which would enable Germany to be excepted from the list of scheduled countries for the import of cattle; and whether there was any objection to the immediate admission of cattle from the Duchy of Oldenburg on the same conditions as cattle were now imported from Schleswig-Holstein.

Lord Sandon said that negotiations had been going on since the Conference of 1872 with the view of removing the restrictions on foreign cattle. Pending those negotiations, the Privy Council did not think it expedient to relax the restrictions with respect to importation from the Duchy of Oldenburg.

COLEMAN PRIZE AWARD.

At the Annual General Meeting of the Governors of the College held July 14th, C. N. Newdegate, Esq., M.P., in the chair, the following award of the "Coleman Prize" was made on the report of the Professors. The essays selected as being the three best were those bearing the respective mottoes—*Fiat justitia ruat Cœlum*," "*Nil Desperandum*," and "*Excelsior*."

On opening the sealed envelopes the Chairman announced the successful competitors to be—

Mr. Anthony Willows, Wareham, Norfolk—*Silver Medal.*
„ Jno. Reynolds, London—*Bronze Medal.*
„ F. W. Hanks, Dalston—*First Certificate of Merit.*

OBITUARY.

We much regret to have to record the death of Mr. Henry Lepper, M.R.C.V.S., Aylesbury, an eminent and highly respected member of the profession. Mr. Lepper, who had attained the almost patriarchal age of eighty, did not become a graduate of the profession until the year 1831, having previously practised for several years at Lydd, in Kent. The greater part of his useful life was, however, passed at Aylesbury, where he deservedly stood high as a man of sterling worth and of no mean professional attainments. In 1853 he was elected a Vice-President of the Royal College of Veterinary Surgeons, and in the following year entered the Council as one of the chosen of the profession. In 1856 he attained the position of an Examiner, and took his place at the Cattle Pathology table. The duties of this honorable office he continued to perform up to 1873, when the old Court of Examiners was broken up, and the new code of Bye-Laws, which altered the division of the Court, came into operation.

We have also to record the death of Mr. W. C. Lord, M.R.C.V.S., London, late of the 9th Lancers. His diploma bears date April, 1842.

Mr. R. Nicholson, M.R.C.V.S., Wormsley, Yorkshire. Diploma dated April 24th, 1844; and

Mr. T. A. Byron, M.R.C.V.S., Bradford. Diploma dated May 1st, 1863.

THE

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Communications and Cases.

THE GEOGRAPHICAL EXTENSION OF RABIES.

By George Fleming, M.R.C.V.S., Royal Engineers.

The geographical extension of contagious diseases is always a subject of the greatest interest and importance, not only to the medical philosopher, but to mankind at large; and the present century has furnished some most startling and, it it may truthfully be said, painful instances of transmissible animal maladies being carried to most distant countries, where they have proved even more destructive than in their native regions. So little was known of the geographical limits of rabies until within a few years ago, that we are often in doubt as to whether it has been recently imported into regions where it is now witnessed, or whether it was always prevalent there. For example, the older travellers have stated that this malady was not known in Asia Minor, in Egypt, nor in Algeria; but we now have abundant and most melancholy evidence of its presence in these regions; and only the other day, in looking over an Arab hippiatric treatise, some six hundred years old, we found the symptoms in the horse, resulting from the bite of a rabid dog (*add el-Kalib*) well described; proving that the disease must have been recognised in Arabia at a very early period, notwithstanding the positive assertions that it was unknown there a few years back.

How far the malady may owe its extension to its contagious properties, or to the importation of dogs from coun-

tries in which it prevails to those in which it had not previously been observed, is difficult to decide. It is certain, however, that rabies has not been witnessed in Australia or New Zealand, nor yet, it appears, in South Africa, Madeira, and some other parts of the world;* though European dogs must have been more or less largely imported at various times. Why have these countries remained exempt from the scourge? The contagion sometimes breaks out in a truly alarming and epizötic form in countries where it has not been previously noted—as in the West Indies in 1783, and Peru in 1803—and without any reasonable cause being assigned for its manifestation. Why have Australia and New Zealand escaped?

We have evidence of its importation into some countries —as into La Plata in 1806, by sporting dogs belonging to English officers; and into the Mauritius in 1813, by English-bred dogs from the Bay of Bengal; but this evidence fails us with regard to other regions, and yet it can scarcely be denied that, within the last seventy years, rabies has either become widely extended, or our sources of information with regard to its geographical distribution over the surface of the globe are more numerous and trustworthy.

In "Rabies and Hydrophobia," all accessible information with regard to this subject was carefully and, we might add, laboriously sifted; so that a chart could have been constructed, showing at a glance those parts of the world where it is known, and those which it has not yet visited. With regard to hot and temperate regions, our evidence was pretty conclusive; and it was only concerning northern latitudes—especially the Arctic regions—that any doubt was entertained. True, we showed that in Sweden, Denmark, Norway, Northern Russia, and Lapland, it was frequently seen, and even in an epizötic form, as in 1815 and 1824; but we stated that in Greenland and Kamschatka it was supposed to be quite unknown. This statement was made on the reports of various travellers, and particularly of Erman, who, in describing the Ostyaks of Siberia and their dog-sledges, says, "Madness among the dogs would be, in this country, a most formidable scourge, and would infallibly cause the destruction of whole races of men; but every one here (at Obdorsk) assured us that the disease is wholly unknown to them. Steller has stated the same thing respecting the dogs of Kamschatka; so that hydrophobia would seem to be one

* In the very brief abstract of the lecture I gave at Manchester, and which appeared in the *Veterinarian* for August, it is stated that the disease is unknown in America. This should have been "some parts of America."

of the European results of living in towns. One essential and unfailing distinction between the dogs of Siberia and those of Europe lies in the very moderate food of the former; whence it might be inferred that it is excess, and not want, which generates the morbid habit."*

Our belief in the correctness of this statement was, however, rather shaken in perusing Kane's "Arctic Explorations,"† where, when frozen up in latitude 70° 41′, he mentions a disease among his dogs which so closely resembled rabies as to cause alarm. On October 5th, 1854, he writes: "Yesterday, the mother of one batch (of puppies), a pair of fine white pups, showed peculiar symptoms. . . . The animal was noticed this morning walking up and down the deck with a staggering gait, her head depressed, and her mouth foaming and tumid. Finally, she snapped at Petersen, and fell foaming and biting at his feet. He reluctantly pronounced it hydrophobia, and advised me to shoot her. The advice was well timed; I had hardly cleared the deck before she snapped at Hans, the Esquimaux, and recommenced her walking trot. It was quite an anxious moment to me, for my Newfoundland dogs were around the housing, and the hatches were open. We shot her, of course."

Speaking of the sunless Arctic winter, it is further remarked: "The influence of this long intense darkness was most depressing. Even our dogs, although the greater part of them were natives of the Arctic circle, were unable to withstand it. Most of them died from an anomalous form of disease, to which, I am satisfied, the absence of light contributed as much as the extreme cold. January 25th.—The mouse-coloured dogs, the leaders of my Newfoundland team, have for the past fortnight been nursed like babies. No one can tell how anxiously I watch them. They are kept below, tended, fed, cleaned, caressed, and doctored, to the infinite discomfort of all hands. To-day I gave up the last hope of saving them. Their disease is as clearly mental as in the case of any human being. The material functions of the poor brutes go on without interruption; they eat voraciously, retain their strength, and sleep well. But all the indications beyond this go to prove that the original epilepsy, which was the first manifestation of brain disease among them, has been followed by a true lunacy. They barked frenzically at nothing, and walked in straight and curved lines with anxious and unwearying perseverance. They fawn on you, but without seeming to appreciate the notice you give them

* 'Travels in Siberia,' vol. ii, p. 34.

† Vol. i, pp, 106, 123, 156, 163, 459.

in return, pushing their heads against your person, or oscillating with a strange pantomime of fear. Their most intelligent actions seem automatic; sometimes they remain for hours in moody silence, and then start off howling as if pursued, and run up and down for hours. So it was with Flora, our "wise dog." She was seized with the endemic spasms, and after a few wild paroxysms lapsed into a lethargic condition, eating voraciously, but gaining no strength. This passing off, the same crazy wildness took possession of her, and she died of brain disease—arachnoidal effusion—in about six weeks. Generally, they perish with symptoms resembling locked-jaw in less than thirty-six hours after the first attack. . . . . My dogs that I had counted on so largely, the nine splendid Newfoundlanders and thirty-five Esquimaux of six months before, had perished; there were only six survivors of the whole pack, and one of these was unfit for draught." "Tiger, our last remaining dog, was seized with a fit ominously resembling the last winter's curse. In the delirium which followed his seizure, he ran into the water and drowned himself."

In a note it is added: "Hydrophobia. The caption at the head of the page is not intended to affirm the existence of the disease in this high North. Some of the tetanoid symptoms attendant upon tonic spasms closely simulated it; but the disease properly speaking is unknown there." And in another place, Kane mentions that of his dogs, "in spite of every effort, no less than fifty-seven perished, many of them with symptoms not unlike those of hydrophobia. The loss of these animals interfered seriously with my original scheme of search."

It will be seen from Kane's description that the mortality among his sledge dogs was very severe—in fact, that they nearly all perished. But what was the nature of the malady? In "Rabies and Hydrophobia," we have said: "It must be admitted that the symptoms described by Kane, especially in the first case he alludes to, bear a most striking resemblance to those noted in rabies, as we shall see hereafter; the duration of the disease and its fatality were also characteristic of rabies; while the pathological alterations in the brain, particularly the effusion, are, as will be pointed out in the proper place, very frequently found in this disease."

Kane had never seen rabies in the dog, and was therefore unacquainted with the symptoms of the disease, which he attributed to the lengthened cold and darkness. But it must be remembered that the Esquimaux dogs are accustomed to the severest degree of cold, and the long Arctic night

which continues for months; and that these could scarcely operate in producing such a fatal malady. Besides, other Arctic explorers previous to Kane had carried dogs even farther north, and no such effects had been observed among them; therefore this anomalous malady appeared to be novel in these high latitudes; but what it was, or how it originated, could not be further ascertained when "Rabies and Hydrophobia" was published.

While in Syria, however, an interesting work* on the Arctic regions was published by Dr. Hayes, an American explorer, which we unfortunately did not hear of until recently. In this narrative of adventures, which occurred some years after Kane's voyage, we glean some most important information with regard to the canine disease alluded to by the latter, and especially as to its wide-spread existence over nearly the whole of Greenland, where it had nearly ruined the Esquimaux by destroying their only means of transport. But we will allow Hayes to describe it for himself. On his arrival in Greenland, in 1860, he discovered "that a disease which had prevailed among the teams during the past half-year, had diminished the stock to less than half of what was required for the prosperity of the people; and all our offers to purchase, either with money or provisions, were at first flatly refused, and were in the end only partially successful. . . . . So great and universal had been the ravages of disease among the animals, that many hunters were wholly destitute, and none were in possession of their usual number."

In another portion of the work he refers to the epizoöty in more detail:

"I have mentioned that a disease had been for several years prevailing among the dogs of Southern Greenland, and that a large proportion of these useful animals had fallen victims to it. The cause of this disease had not been determined; but I was led to believe, from what information I could obtain, that it was purely of local origin, and that, therefore, when I had removed my teams from the seat of its influence I would be freed from its dangers. Under this impression, I had consumed much time at the Danish-Esquimaux settlements, in picking up here and there a dog, until I had obtained thirty-six animals. Up to the 1st of December they remained in perfect health; and being fed upon an abundance of fresh meat, I had great confidence that I should be able to carry them through to the spring, and when the period of my sledge explorations should arrive, that I would have four strong and serviceable teams. My

* 'The Open Polar Sea,'

fears were for a time somewhat excited by the information received from Hans, that the Esquimaux of Whale Sound and vicinity, with whom he had been living, were heavy losers by the death of a great number of their dogs, and the description which he gave of this distemper corresponded with that of Southern Greenland; but November being passed without any symptoms of the malady having made its appearance in my splendid pack, I felt hopeful that they would escape the visitation. The loss which Dr. Kane had suffered by the death of his teams was fresh in my recollection; but for this there appeared to be a sufficient cause. Being almost wholly without fresh food of any kind, he was compelled to subsist his teams upon salt meats, which, giving scurvy to his men, could hardly be expected to act otherwise than injuriously upon the dogs, which had always before been used to a fresh diet of seal meat.

"My hopeful anticipations were, howeyer, not realised. One day early in December, Jensen reported to me that one of the finest animals had been attacked with the disease, and recommended that it should be shot, to prevent the disease spreading; and this was accordingly done. A few hours afterwards, another one was seized in the same manner. The symptoms were at first those of great restlessness. The animal ran several times around the ship, first one way and then the other, with a vague uncertainty in its gait, and with an alternate raising and lowering of the head and tail, every movement indicative of great nervous excitement. After a while it started off towards the mouth of the harbour, barking all the while, and seeming to be in mortal dread of some imaginary object from which it was endeavouring to fly. In a little while it came back, still more excited than before. These symptoms rapidly increased in violence, the eyes became bloodshot, froth ran from the mouth, and the dog became possessed of an apparently uncontrollable desire to snap at everything which came in its way.

"The disease ran its course in a few hours. Weakness and prostration followed the excitement, and the poor animal staggered around the vessel, apparently unable to see its way, and finally fell over in a fit. After struggling for a little while in the snow, consciousness returned, and it got again upon its feet. Another fit followed soon afterwards; and then they came one after another in rapid succession, until finally its misery was relieved by death, which occurred in less than twenty-four hours from the incipience of the attack. Meanwhile I had watched it closely, hoping to discover some clue to the cause, and to establish a cure. But I

could obtain no light whatever. Dissection revealed nothing. There was no apparent inflammation either of the brain, the nerve centres, the spinal cord, or the nerves themselves; and I was wholly at a loss to understand the strange phenomenon. That it was not hydrophobia was shown by the fact, that the animal rather desired than shunned water.* Many of the symptoms attending that disease were, however, manifested; but it did not, like hydrophobia, appear to be communicated by the bite; for those dogs which happened to be bitten were not more speedily attacked than the others.

"This case had scarcely reached its fatal termination before another was reported; and it was relieved of its misery by a bullet. Seven died during four days, and I saw with consternation my fine teams melting away and my hopes endangered; and while this was in progress I could only look on and wonder and experiment, but could never stop the contagion nor arrest the evil.

"Among the first dogs attacked was a superb beast that I have before named. He was the best draught animal of my best team, the second leader—Karsuk. I have never seen such an expression of ferocity and mad strength exhibited by any living creature, as he manifested two hours after the first symptoms were observed. Thinking that confinement might do good, and desiring to see if the disease would not wear itself out, I had him caught and put into a large box on the deck; but this seemed rather to aggravate than to soothe the violence of the symptoms. He tore the boards with indescribable fierceness, and, getting his teeth into a crack, ripped off splinter after splinter until he had made a hole almost large enough for his head; when he was ordered to be shot. At this moment his eyes were like balls of fire; he had broken off one of his tusks, and his mouth was spouting blood. Soon afterwards another fine animal, which seemed to be perfectly well a few moments before, suddenly sprang up, dashed off with a wild yell, wheeled round the harbour, returned to the vessel, and there fell struggling in a fit. I had him tied, but he tore himself loose, and, fearful for the other dogs, he too was killed. Three others died the same day, and the deaths during the first two weeks of December were eighteen. This, with the losses before sustained, left me with only twelve animals. One week later these were reduced to nine."

* This is the antiquated nonsense, long since exploded, which Grantley Berkeley, and others who have never seen the disease, yet believe in, with regard to rabid dogs being afraid of water, and going into convulsions at the sight of it.

Eventually nearly all perished, and this misfortune indirectly caused the death of one of Hayes' colleagues—a most promising man of science.

In the French edition of this work, published in 1872,* the editor, Belin de Launay, informs us that the epizöty continued up to that date, and that it prevailed from Smith's Straits to Jacobshaven. The distress it caused was very great; and Hayes, when speaking of an Esquimaux chief, tells us of the sufferings he and his people endured from the mortality among their dogs. Indeed, if the epizöty is not soon extinguished, it is not improbable that the canine race will entirely disappear from these regions. And if so, what will become of the Esquimaux? Their dogs are to them invaluable treasures, without which they have no security against want and starvation to themselves and their wives and children. Will they become extinct when their canine companions and servants have died out? Or will they be able to migrate to more genial latitudes, and change their mode of life altogether? Either Steller or Wrangell, we forget for the moment which, tells us of a tribe in Siberia which, from living inland and being pastoral, had to wander to the sea-coast and become a nation of fishermen, through a deadly malady which destroyed all their reindeer.

Was this dog malady rabies? From the symptoms detailed by Hayes, it certainly bears the greatest resemblance to that disease. Hayes' teams were collected in districts where the epizoöty prevailed, and therefore we need scarcely be in doubt as to its contagiousness. The initial symptoms do not appear to have attracted attention, and it was only when the more violent indications appeared that the existence of the disease was noted.

No measures appear to have been adopted by the Esquimaux to prevent the extension of the scourge, and the contagion was evidently allowed to spread as it might, without let or hindrance.

REMARKS ON MÉGNIN'S TAPEWORM.

By T. Spencer Cobbold, M.D., F.R.S., Professor in the Royal Veterinary College.

My attention having been specially called to M. Mégnin's communication, as reported by Mr. Fleming, of the Royal Engineers, in the August number of the Journal, I feel

* 'La Mer Libre de Pôle.' Hachette, Paris.

bound to say a few words on the subject. I must remark, however, that I do so under great disadvantages, as I have neither leisure nor opportunity to refer to several important foreign contributions, a careful examination of which might enable me to set at rest many of the questions incidentally raised by M. Mégnin. I shall limit myself, therefore, chiefly to one point.

My colleague, Professor Simonds, from the very first moment that he glanced at the figures accompanying M. Mégnin's paper, felt inclined to regard this so-called new species of tapeworm as neither more nor less than the ordinary perfoliate cestode in a comparatively young state. At all events, he was perfectly satisfied that several preparations in the Museum of the Royal Veterinary College displayed the same forms of entozoa, whether they were to be regarded as distinct species, or as well-marked varieties, or, again, merely as juvenile specimens of *Tænia perfoliata*. Certainly, if any one will only take the trouble to compare M. Mégnin's figures (as reproduced in the *Veterinarian*, facing p. 622) with one of the Museum preparations, he can only conclude that M. Mégnin's description corresponds with the parasite we have so long been familiar with. The point which chiefly induces Mr. Simonds and myself to regard M. Mégnin's worm as identical with, or, at least, a mere variety of, the common perfoliate tapeworm, lies in the circumstances that our inspection of these preparations, and our own independent examination of greater numbers of the same species of worm derived from various sources, tend to convince us that mere differences of size are in themselves quite insufficient to determine the question of species.

It is true that out of deference to the joint authority of Mehlis (not Mehlin, as rendered at p. 621), Gurlt, and Diesing, I have hitherto spoken of *Tænia mammillana* as a good species; but I have never been able to get a sight of Gurlt's original representation (as given in the *Path. Anat.*, Plate IX, figs. 7 and 11), and I have always secretly doubted if it were anything more than a small *Tænia perfoliata*. In like manner, a perusal of Dr. Davaine's recent article, *Les Cestoides*, in the newly issued edition of the *Dictionnaire Encyclopédique des Sciences Médicales*, p. 591, had put me in possession of the fact that Baillet had described a fourth species of equine tapeworm, which is there simply characterised as *Tænia innomé*. As the matter now stands, and in the absence of what I should regard as sufficiently distinctive characters, I feel compelled, at least provisionally, to look upon M. Baillet's and M. Mégnin's cestodes, and also upon

Mehlis's worm, as varieties only of the common perfoliate species. In the mean time, I think that M. Mégnin deserves great credit for the light he has thus far thrown upon a really difficult question; and I can only regret that I have not just now the means of more thoroughly sifting the question of specific identity, as well as of going into the other questions that have been incidentally raised by M. Mégnin. From the contents of several recent foreign contributions to entozoology, it is perfectly certain that our French neighbours do not, as a rule, take the trouble to watch the progress of helminthological science as it goes on in England and Germany. M. Davaine is a remarkable exception to this rule, as any one may see if he will only read the admirable and exhaustive memoir above referred to. To make good this general statement concerning the neglect thus exhibited, I would refer to the recent *résumé* I have given of a discussion respecting the treatment of tapeworm that took place at the *Société de Thérapeutique* on the 10th of June last (see *London Medical Record* for July 20, p. 472), and particularly also to Mr. Fleming's abridged account of a paper by Prof. Saint Cyr, lately given in these pages (368 *et seq.*). To the original communication reference is also made in M. Davaine's Memoir (in a footnote, at p. 572), whilst the same contribution is likewise summarized by Dr. Paget Higgs, in the *London Medical Record* for September, 1873, p. 582. From these and other memoirs it would appear that Prof. Saint Cyr, M. Trasbot, and several other equally distinguished persons, who speak and write on the subject of tapeworms, are at the present time totally unacquainted with the helminthological results obtained many years since by an extended series of experiments conducted at the Royal Veterinary College. Not only so; they appear to be quite unaware of the extraordinary prevalence of larval tapeworms in Indian cattle, although in these pages and elsewhere we have constantly made this fact public.

As regards the question immediately before us, namely, as to whether the horse is infested with three, four, five, or merely with two distinct species of tapeworm, I am free to confess that fresh microscopic evidences (with a further comparison of the facts presented by a large number of unarmed worms, furnished with lobed appendages attached to the base of the head) are necessary to set this matter finally at rest. In the midst of daily increasing professional and other avocations, I dare hardly hope that I shall myself be enabled to work out the subject in the thorough and systematic way in which it ought to be done.

REVISED LIST OF ENTOZOA, WITH NOTES AND REFERENCES.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

(*Continued from p.* 475.)

11. The true Hydatid Tapeworm (*Tænia echinococcus*).—This is the smallest of tapeworms infesting quadrupeds, measuring only from the one fourth to the one third of an inch in length. It is readily recognised by the fact of its possessing only three joints, which, with the armed head, go to form the entire body.

It infests chiefly the lower part of the small intestine of the dog.

Note.—This worm is very common in Iceland, where, according to Krabbe, it occurs in 28 per cent. of the dogs. The larvæ, as hydatids, prove very destructive to human life in that country. So far as I am aware this parasite has never been obtained from any dog in England, excepting in the instance mentioned below. Abroad, it was long ago observed, but mistaken for some other parasite (Rudolphi, Röll). It was, however, subsequently identified and independently recognised by many well-known helminthologists (Von Siebold, Küchenmeister, Haubner, &c.).

Experiments.—This parasite has been reared by means of hydatid-worm-feedings, conducted by Von Siebold, Küchenmeister, Leuckart, Finsen, Naunyn, and others abroad; also by Mr. Edward Nettleship in this country. My own experiments, chiefly through the interference of an ill-designing person, only led to negative results. Recently I have renewed my investigations, but at the time I am now writing the results have not been ascertained.

There is great need of caution in conducting these inquiries, since any one dog at large may, when much infested by this parasite in the sexually mature state, be capable of giving origin to an endemic that shall, in the long run, prove very injurious, and even more or less fatal, both to man and beast.

Published Cases.—There is no evidence to show that this parasite can give rise to symptoms of disease in the bearer whilst the worm remains in the adult condition; but it occasionally proves fatal to animals in its larval state (instances of which will be quoted hereafter), and it is certainly very fatal to man in some countries.

Specimens.—Numerous examples in my private collection,

contributed by Professor Leuckart and Mr. Nettleship. Some of these have also been added to the Anatomical Department of the University Museum at Oxford.

Figures.—Excellent illustrations of this worm in the adult stage are given by Von Siebold, Van Beneden, and Leuckart, copies of which have been reproduced by Davaine, Thudichum, Verrill, and others. I have also given original representations from the specimens kindly supplied by Leuckart ('Entozoa,' pl. xiii, fig. 6; and in the 'Manual,' fig. 22A). In the 'Proceedings of the Royal Society' the head has been well drawn by Nettleship (vol. xv, pl. 8), and the hooks have been separately illustrated by Krabbe.

12. The Elliptically-jointed Tapeworm (*Tænia elliptica*).—This species is regarded by many helminthologists as identical, or at all events a mere variety, of the cucumerine tapeworm of the dog. I am inclined to regard it as an entirely distinct form. It is a delicate species, seldom attaining more than a foot in length, and has two reproductive papillæ to each joint, one on either side at the margin.

Infests the small intestine of the cat.

In all probability this common parasite, like its congener in the dog, derives its origin from a measle resident in the louse of the cat (*Trichodectes subrostratus*). Be that as it may, it is some satisfaction to me to know (from the happy results obtained by Melnikow in the case of the cucumerine worm before alluded to) that my efforts to rear the measle of the allied *Tænia cucumerina* by experiment in cockroaches (*Blatta orientalis*), though negative in their results, were in the right direction.

Specimens.—In the Museum of the Royal Veterinary College, and in my private collection; also in the British Museum, contributed by the late Dr. George Johnstone, of Berwick, and by Von Siebold, of Berlin.

Figured by Pallas, Batch, Werner, Goeze, Leuckart, myself, and many others.

13. The Broad-necked Tapeworm (*Tænia crassicollis*).—This worm is the most common cestode infesting the cat in this country. It frequently attains a length of from one to two feet, but specimens have been procured up to three feet. It is a stout-built species, and readily recognised by the short and broad neck, which is surmounted by an armed head carrying from forty-eight to fifty-two hooks.

In the larval state this parasite resides in the liver of rats and mice (*Cysticercus fasciolaris*).

This parasite possesses special historical interest for the student of helminthology, inasmuch as it was the species

which (from the manifest resemblance of the heads of the larvæ and the full-grown worm to one another) first led to the idea of a genetic relation as subsisting between the cystic and cestode worms. The similarity was known to Goeze, and its significance was subsequently more fully and quite independently appreciated by Von Siebold and the late Dr. Henry Nelson, of Dunedin, New Zealand.

Experiments.—These have been more or less successfully conducted by numerous investigators (Leuckart, Kuchenmeister, Von Siebold, and others).

Specimens.—Many examples are contained in the Hunterian Museum and in that of the Royal Veterinary College. In the National Museum there are speciments contributed by Von Siebold and Dr. Leach, and I have contributed others to the Museum attached to the Middlesex Hospital.

Examples of the larvæ occur in several of the metropolitan museums, and also in my own collection. Those in the Museum of the Royal College of Surgeons were contributed by Professor Owen and Sir Everard Home.

Figures are given by most of the older writers (Goeze, Bloch, Batch, Carlisle, &c.), and Bremser represents an abnormal form in which the head was furnished with six suckers. Admirable representations are also given by Dujardin, copies of which are also supplied by Professor Allen Thomson in the article "Ovum" in the 'Cyclopædia of Anatomy and Physiology.'

Note.—It is especially worthy of remark that the *Cysticercus pisiformis* of rats and mice constantly attains the tænoid condition whilst still residing in the liver of its intermediary bearer. It is true that this remarkable phenomenon is not by any means confined to the species under consideration, but the interest of this development is enhanced by the circumstance that the joints or proglottides cannot arrive at sexual maturity until the tænoid worm (of whatever species it may happen to be) has been transferred to its proper ultimate host. It is not uncommon to find this tænoid coiled upon itself to such an extent that when taken out of its cyst and unravelled it will measure six or eight inches in length. In all such cases, however, the caudal vesicle still remains attached.

I may add that one of the most remarkable instances of a tapeworm developing full-sized joints or proglottides, without any trace of sexual organs, is to be seen in the *Tetrarhynchus reptans* infesting the liver and also the muscles of the sun-fish (*Orthagoriscus mola*). Only by its subsequent transferrence to the intestinal canal of a shark or some predatory fish can this entozoon acquire sexual maturity.

CASES OF POISONING IN HORSES.

By William Field, Junr., M.R.C.V.S., London.

On the 8th August last I was asked to see some cart-horses which had been taken ill whilst on their return journey, having delivered a load of stone at the Hall, Edgware, where a large building is about to be erected. The messenger reported that one horse had dropped down dead close to the sixth milestone on the road, or some two and a half miles from the Hall. I went at once, and found two horses in a dying state in a farmyard to which they had been taken as soon as the one which was already dead had fallen. They were reeling and staggering about, cold and pulseless, with blanched mucous membrane.

The carman or driver had already given the horses one of Law's drinks. Finding that they were too far gone for my skill to be of any avail, I questioned the driver with a view to ascertain the cause of the symptoms, when I ascertained that no less than twenty-two horses, apparently in perfect health and in good condition, mostly young and valuable animals, recently purchased by their owner for this particular contract, had started that morning to draw some blocks of stone from London to the Hall, at Edgware, some eight and a half miles. The men stopped on their way at the Red Lion public-house, at the Hyde, about six and a half miles on the road, where they watered and fed their horses, all the animals being apparently quite well, when they started to complete their journey. They delivered their loads, and, before returning to London, watered their horses at four tubs placed in the field where the building is about to be run up. Within ten minutes after drinking one animal reeled, fell over, and died immediately, perfectly stiff.

My informant, the man in charge of the horses to which my attention was called, then started with his team, which also had been watered, but not at the same tub as that from which the horse drank that died so quickly. He had only proceeded a little more than two miles on the journey when one of his horses died before he could be got out of harness, and two others in about three quarters of an hour afterwards. Finding that nothing could be done for the dying animals, I directed my attention to another team of four which were standing in the road attached to one of the stone trucks or waggons. These I found also affected; pulse ranging from 40 to 60, visible mucous membranes pallid, breathing accelerated, ears cold, &c. All the horses of the team were not affected to the same extent; one of them, a blind grey horse, being much worse than the other three. They were taken into the farmyard, and I ordered some

brandy to be given to each of them as quickly as possible. Three of these recovered; the fourth got rapidly worse, and died, I am told, for I was not there to see, in great agony; but he was very much longer dying than either of the others. All this occurred at about 5 o'clock in the afternoon. About 9 o'clock the same evening I called again to see the survivors, and ordered them to have some ammonia and spirits of nitric æther, and to be led quietly home. I heard the next morning that they were convalescent. I have since heard that of the whole number affected, *three* horses died in a field at the Hall, *three* at the building, and *one* on the road between the building and Edgware, thus making with those I saw *eleven* deaths in all.

The next morning—Sunday—at 10.30, Messrs. Woodger and Broad, myself, and Mr. Milners, my assistant, made a *post-mortem* examination of four of the carcases.

Post-mortem Examination, reported by Mr. Milners.

"The horses examined were the property of Mr. R. Compton. They all presented precisely similar morbid appearances, though the fluids drank were not all from the same vessel, neither were they of the same colour. One of the animals died almost immediately after drinking, the others at various intervals, while some which partook of one or other of the different fluids, though considerably affected, recovered completely, stimulants having been promptly administered.

"The mucous membrane of the alimentary canal presented the chief reliable evidences of the poison, though the brain and lungs were congested, especially the latter, which also presented a few circumscribed blood spots about the size of a halfpenny, in some of the subjects, probably due to other causes. Some of the hearts also showed blushes of active congestion about their ventricles. The mucous membrane of the stomach, especially the villous portion, gave unmistakable indications of the effects of some powerful irritant. It bore generally a sort of purple tinge, probably due to local venous congestion, while there were deep-stained patches studded with petechiæ in various parts.

"The mucous membrane of the small intestines, particularly that of the duodenum, presented an uniform pale yellow colour, was easily stripped from the submucous tissue, and readily broke down when pressed between the fingers.

"The mucous membrane of the large intestines presented much the same condition as that of the villous portion of the stomach, though it was somewhat darker in colour.

"The whole of the contents of the stomach and intestines were in a semifluid condition and large in quantity. The liver of each was considerably congested, but the other organs presented a normal appearance."

A sample of the fluid taken from each of the four casks, together with the four stomachs, one of them intact, containing food just as taken from the abdominal cavity, I had forwarded to Professor Tuson for analysis.

Thinking that Mr. Dale, V.S., of Stanmore, might have seen some of the cases and be able to explain the cause, I placed myself in communication with him. He tells me, however, that he was from home at the time, and consequently did not see the horses; but that his assistant being on the road for Hendon, and hearing of the circumstance, rode at once to the field where the horses had just delivered their load. Three were then dead, and two more were in a dying condition. The symptoms described by him were at first colic, quickly followed by a comatous condition, the animals staggering and falling down dead. Mr. Dale goes on to say—"The tanks were said to have been bought by the contractor to hold the water necessary for the building purposes, and came from some chemical or dye works." What the nature of the poison may be which has done the mischief chemical analysis will probably reveal. Professor Tuson will endeavour to supply this missing link.

The readers of the *Veterinarian* will, I think, agree with me that such unusual and disastrous cases of accidental poisoning are worthy of being recorded.

CHEMICAL ANALYSIS. PROFESSOR TUSON'S REPORT.

Four of the stomachs of the horses referred to above, also four bottles containing liquids, taken, I believe, from the tubs out of which the horses had drunk, were brought to me for analysis by Mr. William Field, jun., M.R.C.V.S. Two of the liquids were perfectly bright and colourless, one was turbid and had a brownish colour, and one was turbid and had a reddish colour.

In each of the four stomachs I discovered arsenic in considerable quantity. The same poison was also readily detected in one of the colourless liquids and in the red liquid, but was absent in the other two. It was suspected that copperas (sulphate of iron), which is used for imparting a reddish-yellow colour to bricks, might have been dissolved in the tub waters, and that this agent, being taken in very large quantities, was possibly the cause of the ill effects which resulted; no sulphate of iron was, however, found in either of the liquids.

Owing to the shortness of the time which elapsed between the symptoms of illness and the death of the horses, it was thought by some that arsenic could not have been the cause of the mischief, notwithstanding that chemical analysis had demonstrated the existence of this poison in four of the stomachs and in two of the liquids taken from the tubs

It must be borne in mind, however, that the arsenic taken by the animals was in a state of solution, and, therefore, in the most favorable condition for quickly entering the blood and producing its well-known toxic effects.

Dr. Taylor states that the average time at which death from arsenic takes place in the human subject is twenty-four hours. According to the same authority, it was formerly thought to be impossible for arsenic to destroy life in a shorter period of time than seven hours. "This rapidity of death was actually considered as a medical fact, which in some measure tended to negative the allegation of death from arsenic." But cases are on record in which life has been destroyed in less than two hours.

It seems to me, therefore, that the general, medical, and chemical evidence brought to light in investigating the cases forming the subject of this communication, points clearly to the horses having been killed by arsenic, notwithstanding that previous experience of the effects of this agent upon the horse had established the opinion or belief that a much greater time was required for the production of its fatal action.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from p.* 565.)

We may dismiss the Knotworts and Purselanes with the general remark that they, like the Cloveworts, are innocent of any active principle; but these orders contain many species of great interest and beauty, which, as a rule, can hardly be said of the order to which we would now direct more immediate attention.

The Polygonaceæ—*Buckwheats*—may be said, in their alliance with the Rhubarb and Sorrels, to contain acid, astringent, and purgative qualities. The following description of the order by Prof. Balfour is one of the best we have met with.

Polygonaceæ (*Buckwheats*).—A natural order of monochlamydeous dicotyledons, belonging to Lindley's silenal alliance of hypogynous exogens; they are herbaceous, rarely shrubby plants, with alternate stipulate or extipulate leaves, and often unisexual flowers. Perianth inferior, often coloured; stamens definite, inserted into the bottom of the perianth; ovary free, usually formed by three carpels; ovule solitary, orthotropal; styles and stigmas equal to the carpels in

number. Fruit a nut, usually triangular, naked or covered by the persistent perianth; seed erect, with farinaceous albumen. They are found in almost all parts of the world, more especially in the temperate regions of the northern hemisphere. They grow in fields, waste ground, ditches, mountains, &c., and have astringent and acid properties—some being purgative and a few acrid. The astringency depends on the presence of tannin, and their acidity chiefly on oxalic acid. The fruit of *Polygonum aviculare* is emetic and purgative. The fruit of *Fagopyrum esculentum*, another species of Buckwheat, is used as food; the plant is cultivated in some northern countries. The leaves of *Rumex acetosa*—sorrel—and of *acetosella*—field sorrel—are acid and astringent. The roots of *Rumex aquaticus* and *R. hydrolopathum*—the water-dock—and of other species are used as astringents and alteratives. Those of *R. alpinus*, under the name of Monk's Rhubarb, were formerly employed as purgatives. One of the most important plants of the order is the Rhubarb plant.

We have, then, three important genera to notice:

1. *Polygonum*—Buckwheats.
2. *Rheum*, or Rhubarb.
3. *Rumex*, or Docks.

1. Mr. J. T. Syme describes the genus *Polygonum* as follows:—"A very extensive and generally distributed genus of *Polygonaceæ*, consisting of animal or perennial herbs, more rarely undershrubs, found throughout the whole world, but rare within the tropics. They have alternate leaves, with ochreate stipules; and the flowers are usually in spikes or racemes, sometimes contracted into heads, sometimes so lax that they may be regarded as axillary. The perianth is funnel-shaped or bell-shaped, usually pink, white, or red, five-cleft, the segments somewhat unequal, persistent, and usually increasing in size after flowering; stamens five, six, or eight, very rarely four or nine, styles two to three, nut lenticular in the species with two, and three-edged in those with three styles. Several of the species are astringent, as Bistort—*P. Bistorta*—which is occasionally used in medicine; others are acrid, as the Water-pepper—*P. hydropiper*, and some furnish a deep blue, as the Chinese *P. tinctorium*.

The genus is divided into many sections, of which our Bistort and Persicary represent some of the more important. The Persicarys are very troublesome weeds, and more especially where manure is much employed.

The *P. aviculare* and *P. Persicaria* are found growing on exposed dungheaps, where they seed freely, and from which

these plants are doubtless for the most part spread over our fields.

P. hydropiper—the biting Persicaria—derives its trivial name from its acrid and biting taste. It has been employed in medicine as a diuretic, for which purpose the green herb is used, as its properties are lost in drying.

The Snakeweed—*P. Bistorta*—is a pretty species, which is not uncommon in old-fashioned gardens, where it was probably grown, not only as a flower, but as a medicine. It occurs frequently, growing in large circular patches in meadows, and especially those near villages, from which it may be inferred that it has become naturalised as a British plant. We are informed by Mr. Robert Holland that the green tops are eaten in Cumberland under the name of "Easter Man Giants"—Easter-eating—*Fr. mangeant.* The roots were formerly much used in medicine, as they are highly astringent; their decoction in water is found useful as an astringent injection, and as a gargle in sore throats.

At one time it was held in great reverence as a plant divinely appointed to cure every malady; probably one reason which contributed to this was its appearing about the season of Easter, from which it has been called Easter Giant and Passions.

The common Buckwheat is sometimes grown for its seeds, and the seeds of the creeping buckwheat—*P. convolvulus*—are welcome to birds; albeit it is a very disagreeable weed from its flexile spreading or climbing arms.

2. Rhubarb, though not native to this country, is still so generally used as to find a place in almost every garden, and so general has the use of the petioles become for tarts, puddings, preserves, &c., that it has actually come to be termed a fruit. There is reason to believe that in its young state the garden rhubarb is very wholesome, but when very old it perhaps contains too much of oxalic acid, as well as astringent matter, to make its use in this way to any extent at all advisable.

The rhubarb root of the shops is derived rom the East, and several species, or, at least, varieties, are employed for medicinal purposes, such as *Rheum palmatum, R. undulatum,* and *R. compactum.* It is doubtful if the qualities of the different sorts are alike, and it is well known that the roots of different countries present many variations, as thus the Indian root is not so good as the Turkey, and though we can grow and prepare the root very well in this country, it is far inferior to even that of India.

It is much used as a laxative tonic, and is employed in the

human school in several preparations, such as tincture, compound rhubarb, and other pills.

Professor Tuson says it is "but little used in veterinary medicine. Chiefly given to young animals with weak digestions, and to the dog as a cathartic."

Common farriers, cow-leeches, knowing grooms, and carters are fond of mixing it with their nostrums, but if they get the drug at all it is usually the home-grown, and this is again doctored at the mill or elsewhere, so that as little reliance can be placed in any reputed action of rhubarb as of the other mixtures which these people employ.

3. The Docks show their affinity to the Rhubarbs, not only by their structure, but the leaves of some species, as our own Dock Sorrel. *Rumex acetosa*, and the small Sheep's Sorrel—*R. acetosella*—have a pleasant acid flavour, while the roots of the common Dock of our fields and waysides, and an alpine species, are sometimes employed in medicine under the name of Monk's Rhubarb. It is, however, of feeble action, though whether it could be improved by direct cultivation is a question that to us seems to promise an encouraging solution.

The *R. acetosa* of the meadows seems not to be rejected by cattle, but the common docks of our fields and pastures are uniformly rejected either as green food or in hay. They are, then, nothing more than dissightly weeds, taking much space to grow, and uselessly, or rather mischievously, devouring plant food from the soil.

We have, then, in the Polygonaceæ a series of plants very variable in uses and quality. Few, indeed, have very active principles, but most are sufficiently innocent to be used as food, and some are agreeably employed as a substitute for fruit.

ON PARTURIENT APOPLEXY IN THE MARE.

By Thomas Walley, Professor in the Edinburgh Veterinary College.

I observe in the *Veterinarian* of last month a communication from Gerrard, reporting a case of parturient apoplexy in the mare (due, as he considers, to degeneration of the coats of the cerebral arteries), and two other supposed and extremely doubtful cases of the disease, also in the mare, which he makes the basis of an attack upon a theory promulgated by me as to the influence exerted by the arrangement of the cerebral blood-vessels in determining parturient apoplectic attacks in the cow.

I had intended replying to Mr. Gerrard's remarks in

detail, but his communication is, to me, so vague in character and object that I must satisfy myself with calling attention to a few points only in the argument.

Firstly, has Mr. Gerrard taken the trouble to inject and dissect the heads of many cattle with the view of inquiring into the arrangement of the encephalic circulation? If so, has he found an exception to the distribution of the vessels which I have described? I can only say that the exception proves the rule.

Secondly, is there not an equally rapid severance of the materno-fœtal vessels, at parturition, in all animals?

Thirdly, is there not in all animals an equal development of the uterine nerves, and their ganglia, during gestation?

If Mr. Gerrard will peruse carefully any essay on parturient apoplexy he will observe that I strongly enforce the necessity of distinguishing between *parturient apoplexy* and *parturient convulsions*. He will also find that my reference to the theory of Drs. Moore and Reid bears more upon the treatment than upon the pathology of the disease; and, further, that not one fact which he notices in connection with the causes and nature of this affection has been overlooked by me, while he fails to call attention to many collateral circumstances which I have mentioned. He also ignores the increased plasticity of the blood in these cases and the influence which arrested molecular change, in the brain and medullary structures, must necessarily have in favouring the congested condition of the cerebro-spinal vessels.

Mr. Gerrard puts forward the opinions of the late Professor Barlow—opinions which I have never before seen, but which marvellously support my theory and contradict that of Mr. Gerrard—for at p. 569 Mr. Gerrard says, "*It seems to be one of the peculiarities of this affection that no well-marked lesion is observable in any of the nerve centres, at least to the unaided eye;*" and a little lower down in the same page, "nor do *post-mortem* appearances bear out the hypothesis, *for there is almost an entire absence of any well-marked lesion either in the brain or spinal cord,*" while, at p. 573, Professor Barlow is made to say "that its essential nature consists of *congestion of the nervous centres, and in many cases of speedy effusion into its tissue,* causing *complete disorganization* thereof, a consequent inability to perform or preserve its functions in the animal frame."

Finally, I fail to detect what "*unscientific practices*" Mr. Gerrard has attempted to expose or prevent the repetition of; neither can I see that his remarks have thrown, or tend to throw, any additional light upon the subject of parturient apoplexy.

VETERINARY TOXICOLOGY.—THE ACTION OF RANUNCULACEÆ ON THE HORSE.

By John Gerrard, M.R.C.V.S., Market Deeping.

The species of this genus, popularly known as the buttercups, abounds almost everywhere in pastures, and is so inextricably mingled with the herbage in some places as to make it appear doubtful whether it contains any acridity, or causes the least annoyance to cattle, which must, of necessity, consume more or less of it while browsing in the meadows where the plant is found in greatest abundance.

Horses, with their nicer discriminative faculty, uniformly avoid it, and hence its effects have rarely been observed, unless, as in the undernoted cases, it was given chopped up and mixed with oats.

There are no less than fifteen species of ranunculus, or crowfoot, natives of these islands, and common in our meadows and pastures, and most of them have more or less irritating properties. Those which are esteemed most irritating are *R. flammula*, *R. bulbosus*, *R. sceleratus*, *R. acris* and *arvensis*. The genus ranunculus is characteristic of a cold, damp climate, poor and wet soil; and is less acrid in such situations than when grown in warm climates. It is asserted that an annual species, *R. arvensis*, has been proved to be fatal to sheep in Italy.

Every part of the fresh plant is pervaded by an acrid principle, which is volatile, and dissipated by heat or drying. The juice of the plants is a powerful vesicant, and prior to the introduction of cantharides was used by medical men for this purpose. Owing, perhaps, to its universality and abundance in our pastures, it has come to be regarded as innocuous, or at least without suspicion of being productive of any bad effects. No cases, so far as I am aware, are recorded of its effects on horses, or on cattle and sheep, in this country, although its effects on the latter have been observed on the Continent.

Some cases which lately came under my notice make me doubt whether it has not been overlooked as a cause of harm to horses when made to feed on it, either chopped up with other food, or when they have been compelled, through its abundance, to consume it in the pastures.

On 3rd June last Mr. Thomas Chesterfield, Deeping St. James, called upon me to say that all his horses (eight in number) "had got influenza, were coughing badly, swollen

about the mouth, and would not eat." Two of them had shown symptoms of colic, and had had a draught before I saw them, and the tympanitic symptoms had subsided.

I found them as described, and several of them were smacking their lips, from which a quantity of ropy mucus hung. Some of them seemed excited, had an anxious expression, were pawing about in their stalls, and occasionally neighing when the keeper approached the cornbin, while others were evidently suffering abdominal pain. At short intervals some of them were seized with a peculiar spasmodic action in the throat, as of difficult swallowing, followed by an approximation of the head towards the chest, and a dragging down of the larnyx, causing a shortening of the space between the inferior maxillary bones and the sternum. This was sometimes followed by a fit of coughing and eructation, with a discharge of watery fluid through the nostrils. At other times the spasmodic action of the pharyngo-laryngeal muscles was all that took place. Nor was this observable in all to the same extent. In some of the horses the abdominal muscles were violently contracted, as though in the act of vomition. In all of the animals the lips were more or less swollen, the buccal mucous membranes were red and turgid, and there was a copious flow of saliva from their mouths; there was no discharge from the eyes. The pulse was slightly quickened.

The horses would eat oats or beans when presented to them, and this fact, together with the refusal of their ordinary food, directed my attention to the nature of the disease.

For the three preceding days the animals had been fed upon grass cut from a meadow that had never been mowed before, in consequence of a field of tares, their usual food at this season not being ready, owing to the dry summer. The grass had been chopped up with some oat straw, and the usual allowance of oats and beans mixed with it. The animals had eaten freely of the mixture the first day, but on the afternoon of the second they did not clean out their mangers as usual; and when I saw them on the afternoon of the third day a great quantity of the food lay before them, from which they had picked nearly all the oats and beans. A cursory glance at a quantity of it on a waggon revealed the fact that it was composed chiefly of buttercups, with less than a half of ordinary natural grasses found in meadows.

It was exceedingly acrid to the taste when a small stalk of it was chewed in the mouth, especially the peduncles. The species present were *Ranunculus flammula*, *R. acris*, and

R. repens ; the first and second were in greatest abundance, and most acrid.

A cure was speedily effected by withholding the acrid food and administering a mild aperient to each horse. Two days afterwards nothing could be observed amiss but a slight desquamation of cuticle about the lips of three of them.

Case 2.—A five-year old, half-bred, cob mare, the property of Sisson Martin, Esq., Helpstonheath ; had been put to light work in the field from 7 a.m. to 3 p.m. on the 15th of May last. A quantity of lawn mowings and hedge-side clippings were placed in her manger, of which she ate greedily, also a quartern of oats and beans in some chaff ; her usual quantity of water was given about half an hour after she was placed in the stall. About 7 p.m. she showed symptoms of abdominal pain, getting up and lying down, and rolling violently. The usual colic drink was given, which temporarily relieved her. Two hours after she began to retch, and, as they thought, vomit, in consequence of which I saw her at 11. No particularly decided symptoms were manifested; the pulse was 48 and soft ; there was slight tympanitis, the breathing was slightly accelerated, and the temperature was normal.

The peculiar spasmodic action in the throat which I have already described was well-marked, and the eructations occurred at intervals of fifteen minutes, and continued a few minutes, increasing in severity each time, until the third occurrence, when a quantity—probably half a pint—of sour-smelling watery fluid, mixed with portions of badly-masticated food, was discharged through the nostrils. This was followed by a fit of violent coughing, caused evidently by the passage of some of the fluid into the larynx. I mentioned the probability of ruptured stomach to the owner, but the absence of any urgent symptoms—always present in cases of rupture,—and knowing the fact that vomition may occur without rupture, I thought it possible that the emesis might have been induced either by the nature or, more probably, the quantity of food consumed by the mare while in a hungry, exhausted condition. I administered the following : Spt. Æther. Nit., ℥ij ; Sp. Amm. Aromat., ℥j ; Ext. Hyoscyami, ʒj ; Aq. Menthæ Pip., ℥ij. This seemed to slightly allay the irritability of the stomach, but the coughing and spasms continued for some time, and about half an hour afterwards the mare lay down, the spasms, with the occasional discharge of watery fluid through the nostrils, continuing. She lay quietly on her left side for more than an hour, then got up, seemed easier, and drank water. The pulse was 60 and full. Gave Tinct.

Opii ʒjj in linseed gruel, and allowed some oilcake gruel to drink. At 4 o'clock she seemed much better, so I administered a 4-dram ball and left. At 11 next day all the bad symptoms had disappeared; she would eat nothing, but drank small quantities of gruel. Purging took place in twelve hours, and continued for twenty-four, after which she gradually recovered.

My attention was not directed to the character of the food until the occurrence of the former cases some nineteen days afterwards, and when I visited the place some three weeks after, I found the places where it had been cut from complete thickets of flowerless branches and roots of the *Ranunculaceæ*, the characters of which I was unable to determine, from the absence of the flowers or fruit. I was convinced, however, that the meal in question must have been composed, to a large extent, of common buttercups, which the hungry, exhausted animal had greedily devoured.

The other occurrence of a similar kind happened about two years ago, in a team of five cart-horses and a nag, the property of the late Mr. Pine, Tallington Lodge. The circumstances under which it occurred were precisely similar to those of the first case. The horses were very poor, were attacked all at once with cough, a profuse discharge from their mouths, and want of appetite. The spasmodic action in the throat was very well marked; indeed, painful to look at, for at each spasm, which happened every few minutes, the neck shortened and the head came nearly in contact with the sternum. Coughing did not take place at each contraction; it seemed more an inability to swallow from irritability of the pharynx, or retching in attempts to vomit. The movement was so peculiar that I was at a loss to account for it at that time; but I now regard it as characteristic of the action of the plant. The food of these horses was composed of cut straw and meadow grass, and a few oats. I examined it minutely, but could discern nothing peculiar, and did not suspect the buttercups at that time; and as the owner had a strong suspicion that the attendant had put some drug in the food to improve the horse's condition, I ordered the food to be discontinued. This, with an aperient, and a stimulating liniment to the throat, had the desired effect, and next day the animals were as if nothing had been amiss.

That the Ranunculaceæ possess acrid properties no one will deny, and that they are capable, when taken in sufficient quantity, of inducing vomition in the horse, may be fairly inferred from these cases. No other article of provender with which we are acquainted is capable of producing similar

symptoms. Even when the stomach is filled to repletion, and when rupture occurs through any other kind of food, I have never observed the same train of symptoms as were present in all these cases to a greater or less extent.

These were, first, a spasmodic action of the glottis, shortening and rigidity of the muscles of the neck, and violent contraction of the abdominal muscles, followed by a discharge of fluid through the nostrils; indeed, all the phenomena usually present is a complete act of vomition. In cases of vomiting from rupture, or overgorging with other kinds of food, the act is more of a passive kind; there is a stretching out of the head and neck, little, if any, abdominal effort, and the peculiar spasmodic action in the pharynx is not observable until the return of the ingesta from the stomach, when a choking sound is heard during its passage through the posterior nares, and generally some of it falls back into the trachea, causing a fit of coughing, after which the head is extended, and the watery fluid trickles through the nostrils.

I am inclined to believe that the *action* of the stomach itself is sufficient to effect this, and that a ruptured stomach is the *result* of vomiting and not the cause of it.

I find, however, that I am entering on a disputed subject, involving some important physiological and pathological questions, the consideration of which I must reserve for another opportunity.

CATTLE TRADE.

By W. A. Cox, Staff Inspector, Dublin.

Any question that affects the price, quantity, or quality of food will always command a great amount of public attention, and although many inquiries have been made upon the subject, it is not yet exhausted.

We are as a people essentially flesh consumers, indeed we could but barely exist on a vegetable or slop diet, but must have food of a good substantial nature; whether this is owing to the peculiarity of the climate or to an acquired taste it is not material to investigate. The poorer classes as well as the wealthy eat meat to as great an extent as their means will allow, and it is, perhaps, to this circumstance that we owe much of our stability and vigour.

The supply of flesh meat is, then, not simply a question of

cost, but of health, as the want of it would individually debilitate and lessen our national stamina.

As far as possible Great Britain breeds and rears her own stock; but although England has an area of 32,590,397 acres, Scotland 19,639,377, and Wales 4,734,486, she cannot produce what she requires for her various purposes, and the amount imported from Ireland and from abroad gives some idea of the deficiency of the native production. The causes are these:—the constant and never-failing demand for food; the great mortality of animals from disease; the slaughtering of calves and animals long before they attain bulk and maturity; and to such an extent was this practice carried on a few years ago as to call for public remonstrance in several journals. The excessive mortality that we find in town dairies causes a great decrease in the number of milch cows. These places are invariably hotbeds of disease, and the losses are so great that it is requisite to import even this class of cattle.

For the purpose of grazing, a great number of animals are imported, and it is alleged that English graziers are desirous of the imposal of further restrictions upon the importation of stock into the country, and that by such means they would be able to obtain a higher price for their fat animals. Doubtless the price would increase, but a person of ordinary intelligence would know that the price of store stock must increase in *ratio*, and the gain would be *nil*, or most probably reversed. A more definite explanation is this: the graziers wish to go to market with the knowledge that they are protected by certain measures from the risk of buying infected animals; and with this knowledge we should have a more spirited trade, the demand would be as large, if not larger, and the prices better. It is well known from experience that, previous to any restrictions, buyers, when selecting imported stock, always allowed a margin in the amount of purchase money against the risk of disease; not only amongst the herd they purchased, but for the risk of infecting their home stock. What benefit would stock be to them if for every one they bought they lost two? Some years ago this was of frequent occurrence, and stock-owners, whose *all* was invested in their animals, were in some instances reduced from decent positions even to destitution.

Fat animals are imported into England, in considerable numbers, from Germany, Holland, Austria, and their dependencies, from Spain and many other states; under the present management these are rarely, if ever, put in contact with *home* stock, but are for almost immediate slaughtering. But for stock of all classes our largest *entrepôt* is Ireland;

she supplies large numbers of cattle, sheep, and pigs for all purposes and of all ages. Her fat cattle are superior to any imported, and far exceed in numbers those of all other countries. She sends stores for feeding, or "pasturing on" to attain size and maturity, and even dairy cows for their produce. The number exported thence has annually increased, and there can be no hesitation in stating that the resources of Ireland in this line are not yet fully developed; enterprise and capital properly applied could bring under pasture immense tracts of land that are at the present time nothing but bog and morass. In 1851 the returns of the waste lands were 5,023,984 acres, in 1861 4,357,338 acres, and in 1871 4,259,795 acres, and this is out of a total acreage of 20,815,460; the difference in the returns show that, although such districts are coming under cultivation, it is but slowly, and that less land was recovered between 1861 and 1871 than in the previous ten years. This land is of the best quality and easily reclaimable. An investigation of these facts will remove all fear of famine, and will probably induce capitalists to take an interest in the subject. Judicious expenditure, assisted by mechanical and engineering skill, would accomplish the end spoken of, and the outlay of capital would be returned *cent. per cent.* They would occupy the position of public benefactors by giving employment to great numbers of individuals, besides supplying the mass with an increased quantity of food of the best description.

In England, however great the increase in the supply, it has not kept pace with the demand—the increase in population has always been relatively greater; families that have hitherto been small consumers of flesh meat now use it regularly; this is owing to the greatly increased scale of wages. The artizan class are large purchasers of meat, and will have it of the best quality.

A great outcry has been raised respecting the introduction of contagious diseases by means of imported stock; doubtless this was the original starting-point of many of them, but they have been fostered and developed amongst us in various ways, and owing to our neglect of repressive measures have become *indigenous*.

It is well known that contagious pleuro-pneumonia, foot-and-mouth disease, and cattle plague so originated, and the two former diseases have existed amongst us since their introduction. The reason we got rid of the latter so effectually and quickly was by slaughtering the animals affected, and "stamping it out" wherever it appeared.

Foot-and-mouth disease, called at first the "epidemic,"

broke out in Norfolk in 1839; contagious pleuro-pneumonia in 1841. It had then existed for a short time in Ireland, and prior to that on the Continent. Cattle plague, or rinderpest, appeared in June, 1865, and active restrictions came into force when the contagious and fatal nature of the malady became known, and these ultimately cleared away the disease.

The Contagious Diseases (Animals) Act, 1869, was passed by Government for the prevention of the importation or movement of animals labouring under contagious diseases, and this Act has been supplemented from time to time by Privy Council orders as they have been required. That their operations have been beneficial is shown by the *present low rate of disease*. Foreign states, as Austria, Germany, and others, are so convinced of the advantages of these measures, that they follow them out more thoroughly than we do. The diseases coming under the regulations are cattle plague, or rinderpest, pleuro-pneumonia, foot-and-mouth disease, sheep-pox, sheep-scab, glanders, and farcy. The measures adopted have consisted in the detention of animals affected with any of the above-mentioned diseases, and the prevention of their movement out of their own locality or habitat, or in any manner likely to bring them in contact with healthy animals.

The measures for preventing the free and unrestricted trade in cattle have caused frequent and vexatious discussions; various changes have been advocated; but it is rare that in the heat of argument any subject gets treated with perfect fairness by the partizans of either side; they too often allow prejudice or self interest to sway them. Many who have written upon this matter have either no knowledge of it, or have allowed the bias of their own minds to induce them to misstate the facts.

We have two distinct parties debating the question; one consisting of export graziers, wholesale butchers, and cattle salesmen. These are either entirely opposed to *any* interference with the "trade," or they would so modify or arrange the restrictions as to make them practically useless.

Graziers who have large tracts of land, and who feed extensively, often export their own animals, consigning them to a cattle salesman in England, who acts as their agent. When an infectious or contagious disease appears amongst a herd, if they are fat or nearly so, they imagine that it would be better to immediately dispose of them, as by this means they would save loss in condition or by fatality, and they would at once be able to restock their pastures; but the present law prohibits this, and for this reason they are opposed

to it. They should remember that stock, so diseased, will in transit infect hundreds, or even thousands of others, and that by removing them and spreading the disease, a trifling or individual loss becomes a great or even a national calamity.

In England the removal of the restrictions upon foot-and-mouth disease greatly increased the number of affected animals, and although it is rarely fatal save in the malignant form, there is no malady that causes such indirect loss.

The Irish graziers, who are large purchasers of store stock, should remember that these measures protect them as well as others, as they can purchase animals with less fear of disease or risk of contagion about them.

Large dealers imagine that restrictions prevent the equable show of stock at fairs or markets, and that they cause the prices to fluctuate to a great extent; but hot-dry or cold-wet seasons, in fact, anything influencing the supply of keep in England, will always more or less affect the demand for store animals. The less disease there is amongst stock the more secure the position of the dealer.

The cattle salesman and the butcher wish restrictions to be removed, on the principle that a "nimble sixpence is better than a lazy shilling," or they may have been, on some occasions, annoyed by necessary quarantine regulations.

The opponents of prohibition, by way of settling the argument, say that the Liverpool import of stock from Ireland has greatly decreased. Although this statement, strictly speaking, is correct, it is very much calculated to mislead; formerly all animals going to Manchester and many other large towns were sent to that port; for some period these markets have been supplied *viâ* Holyhead, and a return of the exports will show that instead of a decrease there has been more than an average *increase* in the numbers shipped.

The report of the Veterinary Department of the Privy Council, recently published, gives us some interesting information for the past year:—The number of cattle in Great Britain was 5,964,549, being an increase in the year of over 300,000, and of 400,000 above the average of the preceding five years. The number of sheep was 29,427,656, being 1,500,000 over 1872, and more than 1,000,000 over the average. In swine there was a decline in number for the year of 220,000, although the average, which is 2,374,640, was exceeded by 125,000. The number of Irish cattle imported into England for the year was 684,618 against 616,080 in 1872, showing—despite restrictions—an increase of 68,538. Sheep and lambs 604,695 against 518,606 in 1872, an increase of 89,089. There was a decrease in swine of 79,331. More

foreign cattle were imported than in 1872, but not so many as in 1871. Sheep in a similar proportion, but there was a very great increase in the quantity of swine.

In Ireland, the cattle in 1850 were 2,917,949, sheep 1,876,096, swine 927,502. In 1872 these had increased to cattle, 4,059,397; sheep, 4,263,254; swine, 1,388,571. This statement shows the increase that has taken place, although there has been a large yearly export. This stock at the present time equals in value £47,402,624.

That disease increases the price of meat, both by direct and indirect loss, is well known—directly by the death of animals attacked, indirectly by loss in condition, by after inability to accumulate flesh, and by loss of the milk and its products. When we consider the vast amount of stock in the United Kingdom, and calmly view the matter over, we shall find that we have an annual money loss of upwards of £9,000,000; and a loss from contagious pleuro-pneumonia more than equalling the value of the animals imported, and an *indirect* loss, put at the lowest figure, of 3,000,000 more; we cannot feel surprised that stock-owners are anxious to be relieved of their burden.

These computations do not include the losses upon sheep and swine, which are very considerable, especially amongst the former, owing to their inability to fatten, from pain attendant on lameness, the sequel of disease.

The inspection of stock takes place mainly at the ports, and it now exists, is as efficient and stringent as possible, but inspectors labour under disadvantages not commonly known to the public. Both store and fat cattle, sheep and pigs, are carefully examined. They present the appearance of perfect good health and in twelve or fourteen hours disease may be developed so as to be plainly detected. Animals are driven from pasture to fair or market, and if prices are low they are sent to several in succession before sold; they are then shipped to England necessarily crowded together in the holds of vessels—in railway trucks—almost without food, and exposed to great and continuous nervous excitement. Under these circumstances, if on their arrival they are subjected to the least taint of contagion, and they become affected, the conclusion is at once drawn that they were diseased at the time of purchase or even when shipped.

Healthy animals as they are shipped are branded, there being a distinctive number for each port. Those that are diseased are detained and quarantined, and investigations take place to trace the malady. *It is essentially necessary that each port should have quarantine accommodation.*

Veterinary inspectors have had, like many officials, their share of obloquy and reproach, but there are amongst them hard-working, ill-paid men, for what is the salary they receive compared to the work they accomplish if they conscientiously discharge their duty? It should be remembered that they are professional men who have spent a considerable amount of money and years of study to fit them for their position; that when becoming inspectors they must give up all private practice and devote themselves solely to their duty. The amount of work varies in the different ports; in some it is long and continuous, in all the responsibility great, and expenses heavy.

It is necessary to have men who can command respect and efficiently perform their duty, and to retain them. They should be chosen for their good attainments, practically as well as theoretically, but this is impossible with the present scale of pay; it is so low as to prevent men of status from applying for the post, and until it is raised it will be found that this staff duty will simply be used as a stepping-stone to some more remunerative employ. Young men will join, and before they can get practically acquainted with their duties, will retire as soon as they are offered an increase of salary, seeing no perspective advantage in remaining. In some ports a day's duty will be twelve or sixteen hours, and this amongst the labouring or artizan class would be paid for at the rate of a day and a half.

Proper surveillance may be necessary, but it should rest in the hands of the heads of the veterinary department, and not be entrusted to those who have no knowledge of the matter.

Until the position of the staff is more full recognised they will not inspire the public with confidence, as from their ability and knowledge they ought to do. One great reason of this is, that they are subject to other control than that of the true veterinary element; to have everything in unison there should be no interference save on the part of those practically and professedly acquainted with the subject, and in their hands should the sole responsibility and management be left.

I have before spoken of the difficulties attendant upon the detection of latent pleuro-pneumonia, a disease which remains hidden for a much longer period than thirty days, the time of restriction. This would be removed to a considerable extent by *district inspection*, disease would be at once discovered, the removal of any animals prevented, and such restrictions put in force as would completely stifle disease. This should

be supplemented by the extension of compulsory slaughter, and compensation to Ireland. It has been decidedly beneficial in England, where, previous to its introduction, an outbreak of disease ravaged entire districts. Under this system, it is confined to single farms or isolated places. In Ireland, as the law now stands, many owners of stock attempt to conceal the disease, and thus run the risk of being fined, rather than be tied by the restrictions from removing their cattle or from disposing of them. In many instances they treat them with an idea of their recovery. These are the very methods by which the disease is fostered and spread.

Objections have been raised on the score of expense, but according to our greatest authority, it would be met by a subsidy from the national funds, and they could not be used for a better purpose than a national benefit. At the present time, little disease exists in the country, and the adoption of these measures would still further reduce it, and ultimately remove it altogether.

Animals that are fat or in tolerable condition, on the first appearance of the malady, might be slaughtered and used for food, as the disease, although specific and due to the introduction of virus or morbific material into the system, localises itself, and it is not until the blood becomes impure from defective action and want of decarbonization, and the cells of the lungs are blocked up, that the flesh becomes unfit for food.

Many hold the opinion, that when animals have died of this disease, or been slaughtered whilst suffering from it, that there is no risk of infection or contagion from the carcase. This is certainly true in the earlier stages. It would, however, be advisable in all such cases to bury the entire viscera and disinfect the skin, the latter being a great carrier of disease. This should be done under the supervision of an experienced person.

Much might be gained if the present restrictions were energetically and efficiently performed, a thorough inspection were instituted of *rural and town districts*, and full penalties were inflicted for infringment of the Act and orders. Pleuro-pneumonia of the restrictive period of thirty days should be extended to a much greater length of time, as the incubative stage is so much longer. It should be made compulsory to keep those animals that have been in contact with the disease isolated for a much longer period, or to feed and sell them to be slaughtered. These suggestions are offered with the knowledge that they would meet with strenuous opposition, as interfering with the liberty of the subject; but any loss sustained through them might be made good.

Animals that have been in contact with those diseased, or coming from a place where the disease has existed within a certain specified time, should be distinguishably marked; and it would not be amiss to suggest that cattle on infected farms should be branded on the horn, so that they may be recognised, and the brand might have a movable number, from one to twelve, to indicate the month in which the outbreak occurred.

The affixing of numbers to the brands to indicate the different ports has rendered it comparatively easy to trace any outbreak amongst imported stock. In some instances investigation has proved that the disease has been contracted in transit, or after the animals have reached their destination. In other cases it has been a simple, convenient, and often abused custom, when foiled in investigation, to say, "Oh! it was imported!" and I have no doubt it was considered a good and easy way of getting out of the difficulty. Ireland is clearer of disease at the present time than has been known for years. There are only seventy-five farms that are under restrictions for *all* contagious diseases, and this may in a great measure be attributed to the efficiency and salutary effect of such measures. It is a great mistake to suppose that contagious maladies can at once be swept away after having become indigenous.

If it is found difficult to allow of compensation, inoculation should be tried in those stocks where the disease has appeared. Even with compensation this plan ought to be adopted, and with those animals that are apparently healthy, especially if they have been in contact with diseased ones.

I am convinced that no extraneous pressure will have any undue influence with the Legislature; every interest will be duly considered, and the measures adopted such as will be for public good, "due regard being had to the interests of the farmers."

PARASITISM.

By Robert Spooner Hart, M.R.C.V.S., Calcutta.

The Nematoid parasites found between the coats of the stomach of the horse, with a description of their abode, &c., and a succinct reference to other Nematoda found in the horse.

On making *post-mortem* examinations of the stomach of the horse, such is the almost persistent occurrence of the presence of nematoid abodes between the walls of the viscus, that one is almost induced to infer that they are a part and

parcel of the organ. I have observed these parasitical dwellings when making *post-mortem* examinations of the stomachs of freshly imported Australian horses; *ergo*, I infer that the parasite also exists in Australia; in this view I have been confirmed by a veterinary surgeon who has visited the colonies. In individual stomachs the parasitical habitations may be plural or single in number—in exceptional instances I have witnessed three or four—and usually situated under the mucous membrane portion of the stomach, near to the line of union with the cuticular, whilst a few of them may occur under the lines of union, and I have seen some few under the cuticular coat. The abodes vary in size, from a Barcelona nut to that of a good size orange in circumference, being about an inch to an inch and a half when of the latter size through at the centre; from this they invariably decrease in thickness towards the circumference. Sometimes vacated apartments are found, containing a little yellow débris, or, perhaps, nothing; and the part will be shrivelled up to a mere core, or what would appear to be, in some cases, an old ulcer cicatrix. But this is rather exceptional, as they are more frequently found filled with living guests, which, during their residence or occupation of the cavity, seem to keep it in a state of habitable repair, compared with what is seen to take place with the vacated apartments. These tenantable apartments are formed between the peritoneal and muscular coats of the stomach, and are elevated inwardly, raising the muscular and mucous coats, so that by a mere ocular examination of the exterior of the organ you see nothing which would lead you to infer the presence of tumours which the parasitical habitations look like on first opening up the viscus. These parasitical habitations found between the walls of the stomach are distinct developments, the outer casement of the domain appears to be composed of white fibrous tissue, which capsule is filled with the firm white brain-looking substance, in the midst of which canals are tunnelled out. These passages run in all directions throughout the parasitical colony —which possesses one, two, or even three openings upon the mucous membrane—through which orifices the unwelcome tenants can be ejected, in the midst of their yellow cheesy nidus, by squeezing the tumour-like domicile. Some of the canals probably would admit of the entrance of a small size quill; but the generality of them are much smaller. The internal architectural tubular or pipe-like arrangement of these parasitical abodes reminds one strongly of the elaborately constructed fortress of the genus Salpa; for beneath

the molehill, or dome, a habitation or fortress is excavated, with such consummate art and skill as never fails to excite admiration. And doubtlessly, if it were not for the general abhorrence which is felt against parasites generally, the erections and promenades therein constructed by the nematoda under observation would excite as much admiration as those which are constructed by the mole. But it would seem rather ludicrous to admire the architectural instincts of these parasites in raising abodes in the locality in which they do. As with the farmer and the mole, so with the presence of these nematoid erections in the position in which I have described them to occur. The mischief done by them amounts to a mere nothing, for I have never detected any injuries arising from the presence of the parasitical houses. Of course, it would be idle to imagine that they in any way facilitate the function of the stomach, and that the presence of the parasitical abodes would be better than their absence, for the existence of two or three abodes, especially if of a large size, in one stomach, would appear incompatible with perfect stomach operation. But considering that in the horse the chief preparation of the food takes place in the bowels, and that the stomach can almost be dispensed with—in which assertion I am substantiated by the extraordinary pathological conditions in which I have witnessed the stomach involved from time to time in making *post-mortem* examinations—and this I infer is the reason why the presence of the parasitical abode is never recognised during life.

This leads me on to rupture of the stomach; and I do not remember ever having reason to suspect that there was any connection between the lacerated coats and the nematoid residences, for it is usually the case for the rupture to take place at some distance from the tumour; and, in fact, it would appear that the presence of the abodes rather tend to obviate a rupture in the particular part of the stomach in which they are situated; for the peritoneal coat is generally found somewhat thickened over the parasitical dwelling; and in making *post-mortem* examination of an animal sinking from rupture of the stomach, the inference is that the peritoneal coat is the first to give way, and in this we have a reasonable explanation of why a rupture in the coats of the stomach occurs independently and, as a rule, at some little distance from the residence of the parasites.

I have never detected this species of nematoda loose amongst the contents of the stomach, bowels, or fæces, although I have met with several species of nematoda in different parts of the primæ viæ, which, as regards size, and

so far as the unassisted vision could discriminate, were very like those found in the stomach; but when submitted to microscopical examination their species were found different. I have heard it erroneously affirmed that this parasite occasionally becomes the ocular guest of the horse; but this is an idea which can only have been the result of imagination and not examination, for a simple *coup-d'œil* suffices to negative the assertion without having recourse to the magnifying power of the microscope, which would display the greatest dissimilarity between the entozoa under notice and the parasitical eye-guest of the horse. The *Filaria oculi* of the horse, when first observed, is often of an almost invissible size, and then, as a rule, with time it gradually grows, until it attains a size three or even four times, perhaps larger, than the *Spirosa megastoma;* under which cognomen Mr. Gamgee briefly refers to this entozoa, in his work on the 'Diseases of our Domesticated Animals.' Mr. Blaine's 'Veterinary Art' (page 488) also mentions this nematoid entozoa in connection with the names of M. Chaiguand, V.S., and Hartrel d'Arboval. I cannot refrain from mentioning the following interesting case, there being a similar case published in the Veterinary Records for the year 1849, of the finding of nematoidea in the scrotum.

I think it was towards the latter end of 1871, or the early part of 1872, when assisting in an operation for scrotal hernia complicated with hydrocele, that there escaped in the stream of the effusion which spurted out when the tunica vaginalis was divided, two nematoda, not thicker than a good size black-lead pencil mark, and in length about $2\frac{1}{2}$ to 3 inches, and probably of the same species as those invaders which are so commonly found meandering about amongst the abdominal viscera of the horse, ox, and sheep. In this case I attribute the hydrocele to the presence of the nematoidea, and the hernia to the hydrocele. For it is not unreasonable to premise that the presence of two large nematoda in the confined cavity of the tunica vaginalis would prove baneful from their diurnal and nocturnal meandering movements, giving rise to a certain amount of irritation resulting in effusion. Dr. Cobbold remarks that all parasites have a migratory tendency, and it is also a peculiar coincidence in connection with parasitism that individual varieties of parasites should appear to claim a special locale or territory in some part of its host's organism, and yet when they arrive there they appear dissatisfied; at least, such is the inference; and this will apply more to some parasitical invaders than others.

The Filaria occasionally found in the anterior chamber of the eye of the horse is, as a rule, seen to be perpetually in a state of frantic excitement, giving rise when fully developed, and when its general movements are strongest, to symptomatic lachrymation and nictitation. The ocular guests of the horse affords an almost parallel example of a freshly caged imprisoned bird; but the latter, after a time, becomes exhausted, and ultimately is compelled to give up his attempt at release in consequence of failing strength. But not so with the eye-guest of the horse, for by his perpetual movements he exhibits an almost anomalous phenomena to living beings in general, and displays a striking contrast to those animals who pass a portion of their life in a state of lethargy or hibernation.

In the case of the *Filaria oculi* it appears necessary for its well-being and life that it should continue in a state of active movement; for in the event of any obstacles occurring which embarrasses the free movements of the parasite, I have witnessed its growth become arrested and its movements weak and feeble. In fact, it soon appears sickly, and dies.

I apprehend that some (intestinal) parasites obtain their sustenance, not from their host's tissues or fluids, but from the aliment taken by the host. The following would appear a case in point:—A vulture became entrapped in a thick jungle, and being unable to release himself he died. Some days after, when on making a *post-mortem*, the parasites which I anticipated finding were dead and decomposing, and I attributed their death to starvation, in consequence of their host not being enabled to obtain any food.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of July, 1874, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign Ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Calais	London	Sheep-Scab	...	7	...	...	7	7
Total.			...	...	...	...	7	7

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 17th August, 1874."

CATTLE PLAGUE.

This disease, which has existed for a considerable time on the eastern shores of the Adriatic, has been conveyed into Italy, an outbreak of cattle plague having been announced from the district of Brindisi.

The disease is also stated to be rife in Odessa. It still continues in the island of Naxos; also in Croatia, Slavonia, and the border districts; but Hungary is reported free. Cattle plague also exists in ten districts in the kingdom of Poland.

FOOT-AND-MOUTH DISEASE.

There appears to be a gradual decline in the prevalence of this disease in this country, as well as on the Continent.

SPLENIC APOPLEXY.

Outbreaks of splenic apoplexy in various localities are reported to have occurred in the neighbourhood of Copenhagen.

Facts and Observations.

Botany.—We learn with great pleasure (says *Nature*, of July 16th) that during the last three years there has been a very successful class for Botany at the Royal Veterinary College. From some notices of excursions made during the present summer, which have been sent us, we see the field-class is one of the largest in London, or anywhere else we should think, and that the excursions are made the means of valuable training as well as of conveying solid information.

Hippophagy.—The consumption of the flesh of horses, mules, and asses is decidedly on the increase in Paris. Returns show that the flesh of 2111 horses, asses, and mules was sold to the Parisian public during the first quarter of the current year, against 1275 in 1872, and 980 in 1870. A similar increase of consumption is also reported from the provinces. The Society for the Propagation of the Practice of Eating Horse-flesh, at their last meeting, conferred medals on M. Decrose, a military veterinary surgeon, its founder; and on M. Condere, who was the first to preserve horse-flesh. It was stated at the meeting that horse-flesh preserved in February, 1871, by M. Condere's process, and opened in April, 1874, could not be distinguished from beef preserved according to the best methods now in use.—*London Medical Record.*

Action of Induced Electricity upon Air. By R. Böttger (Chem. Centr., 1873, 497).—If a stream of sparks from an electro-magnetic induction apparatus is passed between two platinum electrodes in a glass bulb filled with dry air, the bulb becomes shortly filled with yellowish vapours of nitrous acid. If, on the contrary, the air be moist, and the sides of the bulb wetted with distilled water, while a little water is also placed in the bottom of the bulb, ozone is produced by the discharge, and nitrogen peroxide may be detected in the water. Hence the blue colour produced in the ordinary method of testing for ozone with starch and iodide of potassium may be due either to nitrous acid or to ozone, according to the dampness of the air.

THE VETERINARIAN, SEPTEMBER 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

THE OPENING OF THE SESSION.

IN a few weeks the work of the Winter Session will commence; and the teachers may hope to welcome a large class of students, some of whom will enter upon their studies as freshmen, others will continue the inquiries, in which some progress has already been made, with their appetite for knowledge sharpened by the abstinence of the long vacation. To both classes we have a word to say.

It must have been apparent that the authorities have for some time past been energetically engaged in making alterations and improvements in the internal arrangements of the College, in order to afford the student increased facilities for prosecuting his studies, particularly in the direction of practical investigations. The laboratory for practical chemistry has long been in active work. A physiological laboratory has also been in use for some time, and now a large and convenient pharmacy has been added, to enable the student to acquire that skill in manipulation which is so necessary for the rapid and accurate compounding of medicines. The arrangements in the dissecting room offer every opportunity for the acquirement of a sound knowledge of anatomy; and an extensive and well-filled infirmary, with its necessary adjuncts of operating rooms, gives facilities for the study of veterinary medicine and surgery as perfect as can be furnished within the walls of a Collegiate establishment.

Nothing seems to be wanting but a determination on the part of the student to take the best advantage of the opportunities which are offered. It is much to be feared that even an extension of the means of acquiring knowledge, and the removal of difficulties in the way of learning, have their disadvantages, tending, as they do, to relieve the inquirer from the necessity of cutting out a course for himself,

Auditors and observers are plentiful enough, and they perform what they consider to be their share of the work sedulously. It must, however, be remembered, that hearing a well-digested lecture, and looking on while a sick animal is treated, do not constitute the whole duty of the student of the veterinary art and science.

It is quite possible to acquire within the limits of the College curriculum a general and superficial knowlege of all the subjects which are taught, without much exercise of energy—indeed, without any mental effort at all; but it is also possible to gain solid information by working hard for it; and we need hardly suggest which of the two methods of study is the best.

If the student would hold himself as much responsible to his teachers, while he is engaged in his scientific studies at the College, as he will hereafter hold himself responsible to his employers, the result would soon be evident in the attainment of a much higher educational standard than has yet been reached.

Extracts from British and Foreign Journals.

LEUCOCYTHÆMIA IN DOMESTIC ANIMALS.*

By Professor O. Bollinger, of Zürich.

The number of observations on leucocythæmia in our domestic animals is still so scanty that the relation of new cases must still be of some interest.

Some time since I published a case of leucocythæmia in the pig (*Schweiz. Archiv für Thierheilkunde*, Band xxiv, 1871). I have since observed two cases in the dog, which I will now describe.

I. An old large house-dog had for some time shown symptoms of some disease. He lost his appetite and became thin; and one of the most important symptoms was a rather considerable swelling of the lower surface of the neck, which, on examination, was found to be referable to a distinctly evident enlargement of the lymphatic glands.

* Virchow's 'Archiv,' Band lix, Hefte 3 and 4.

The veterinary surgeon under whose care he was, diagnosed disease of the glands. As the tonic treatment employed had no effect, and the animal seemed hopeless, the owner resolved on his death. The fresh entrails were sent to me for examination, which gave the following results:

There was splenic and lymphatic leucocythæmia. The proportion of the white to the red blood-corpuscles was about one to five. There were hyperplasia of the spleen and of all the lymphatic glands, and leucocythæmic infiltration of the lungs and liver. The lungs were much distended; the pulmonary pleural was normal. Their tissue was slightly emphysematous, of a pale red colour, anæmic; on close examination they were found to be studded nearly throughout with numerous punctiform and linear miliary and submiliary-greyish white deposits, which on microscopic examination were found to consist of lymphoid cells. The bronchial glands were much enlarged—some to the size of a pigeon's egg—and formed a mass larger than a fowl's egg. On section, they were seen to be of a grey-white colour, with dirty pigmented spots, moderately rich in juice, and of the consistence of marrow. From these glands and the anterior mediastinum a thickening and sclerosis of the cellular tissue of the neck extended outwards along the trachea; it had a pale grey-white colour, and enveloped the nerves and large vessels to the thickness of one or two centimètres. A part of the muscular structure of the neck was also encased in the hardened tissue, which also, near the lower end of the trachea, contained several muddy yellow caseo-purulent deposits, varying in size from a hempseed to a bean. These consisted of pus-corpuscles and their *débris;* in the indurated tissue, deposits of round cells could be recognised only in parts. All the cervical glands were enlarged to the size of a pigeon's egg or less, and were of greyish yellow-white colour, and medullary consistence. The heart was of ordinary size; the walls were rather thick, firm, and of brown-red colour. The pericardium was normal. The blood in both sides of the heart was partly fluid, partly loosely coagulated; it was of a clear red colour, and on microscopic examination showed such an increase of the white corpuscles, that there were about five red to one white. This proportion was found also in the blood of the coronary veins. The liver was greatly enlarged: it weighed about 2 lbs. 10 oz. avoirdupois; its edges were rounded, its tissue was of a pale yellowish colour, the acini were very distinct, and some of them very yellow in the centre. Pale red blood

escaped from the larger branches of the portal vein. On fine section of the organ after hardening, the whole tissue of the liver was found studded with an extraordinary number of lymphoid cells. Not only was Glisson's capsule, in its fine ramifications among the acini, changed into rows of cells from 0·5 to 0·8 millimètre in width, but there was an abundant diffuse deposit of lymphoid cells between the rows of gland-cells in the acini themselves. The liver-cells appeared quite intact, and mostly contained only two or three nuclei. Here and there, the fine bile-ducts were found to be plugged and obliterated, having a dull grey opaque appearance, and filled with biliary concretions. The spleen was enlarged about tenfold. It weighed about $2\frac{1}{2}$ lb.; and was $21\frac{1}{4}$ inches long, 6 inches broad, and 2 inches thick.* The capsule was shining, very greatly distended, and of a pale flesh-red colour. On the surface was observed five or six prominent softish nodules as large as a walnut: their colour in the centre was diffuse whitish grey, on the periphery reddish-grey. On section, the nodules were proved to be very pure in blood; both on superficial examination and under the microscope they perfectly resembled Malpighian corpuscles. The remainder of the tissue of the spleen was found on section to be of a pale flesh-colour, anæmic, and rather firm. On microscopic examination, besides an increase and thickening of the normal structures there was found a considerable diffuse deposit of lymph-cells. The mucous membrane of the digestive tube, and the lymphoid glands of the intestines, were normal. The mesenteric, epigastric and portal glands were remarkably enlarged; some of them were as large as pigeon's eggs, of a dull grey-white colour on section, and of medullary consistence. No examination of the kidneys or of the marrow of the bones could be made.

In considering the changes described, we have before us an instructive example of the lieno-lymphatic form of leucocythæmia. Besides the striking increase of the white blood-corpuscles, the remarkable enlargement of the spleen and of all the lymphatic glands calls for attention, as well as the leucocythæmic infiltration of the liver and lungs, hitherto described only in the pig. Whether and how far the sclerotic thickening of the cervical cellular tissue, extending on both sides of the trachea from the mediastinum toward the larynx, and containing caseo-purulent deposits, was connected with the general leucocythæmic disease, I will not

* The normal spleen of a dog of similar size weighs about 39 ounces, and is 9 inches long, 2 inches broad, and 0·6 inch thick.

attempt to decide. The cellular nature of the deposits, as well as their locality, which at first sight suggests a connection with the thymus gland, favours the idea that such relation existed. On the other hand, especially when we take into consideration the caseo-purulent deposits, there appears to be some ground for assuming a traumatic origin for this change.

As leucocythæmia is known to present many analogies with other diseases arising from absorption and contagion, I was desirous of not losing the opportunity which offered itself of testing the question, and made the following experiment:

The juice from a fresh leucocythæmic splenic nodule was mixed with a 0·5 per cent. solution of culinary salt, and a syringeful (Pravaz's) was injected through the right thoracic wall directly into the lung of a small healthy dog.* The animal did not show any signs of disease after the operation, and was killed by strychnia four months afterwards. On section, all the organs were found normal, especially the spleen and lymphatic glands; the number of white corpuscles in the blood was not increased. In the right lung, corresponding to the point where the inoculation was made, there was a subpleural firm nodule as large as a lentil, with a yellowish-white centre and red nodule; microscopically, it consisted of firm fibrous connective tissues with central calcification.

Mosler has also performed experiments with inoculation on dogs, by injecting human leucocythæmic blood into the healthy animal, but also with negative result (*Die Pathologie und Therapie der Leukämie*, Berlin, 1862).† At the time of making his researches, Mosler was not aware of the occurrence of leucocythæmia in the dog; and he explains the failure of his transfusions by the non-occurrence of the process in this animal.

* This method was chosen in consequence of my having obtained with it positive results from the inoculation of human tubercle into dogs, which are known to be inoculated with difficulty with tuberculous products.

† In a case of extirpation of the spleen in a dog which survived the operation, and was killed ten months afterwards, Mosler (op. cit.) found in the great omentum, which was hyperæmic, numerous dark red nodules varying in size from a lentil to a bean, and having externally, and even on section, a great resemblance to spleen and tissue. These spleniform tumours were found, on examination by Roth, to be lymphomata, with dilated vessels and hæmorrhagic; and Mosler concludes that there was a direct relation between the want of the spleen and these new growths. This conclusion is not supported by my observations, inasmuch as multiple spleniform teleangiectasis of the omentum are often met with in dogs, whose spleen at the same time is perfectly normal.

It is evident that the above-described negative results of inoculation from dog to dog, as well as of Mosler's inoculation from man to dog, do not disprove the metastatic nature of leucocythæmia, and that further observations are required. Virchow (*Die Krankhaften Geschwülste*, Band ii) explains the course of leucocythæmic disease by assuming that the blood undergoes certain chemical and morphological changes in consequence of hyperplasia of a lymphatic organ, and that then, as a kind of metastasis, heteroplastic disease of other organs takes place. Leucocythæmic metastatis is thus perhaps to be explained by the transportation of a contagious material and by a kind of inoculation.

In contrast to the result of the above-mentioned inoculations, I believe that leucocythæmia in the dog, considered in one direction, tends to confirm Virchow's opinion as to the origin and spread of the disease. In the spleens of dogs there occur with unusual frequency—according to my observations, made alike on healthy and on diseased animals, in at least ten per cent. of all dogs—true lymphomata. It is extremely probable that these form the starting-point of leucocythæmia: in the case already related, the splenic nodules were certainly present at the beginning of the disease. In confirmation of this assumption, I can bring forward a second case observed in a dog, affording an instance of leucocythæmia in the incipient stage, which rarely comes under observation.

2. A very large old male dog was brought to the veterinary school in this place to be killed. It did not show any special signs of disease, and shortly before death ate abundantly with good appetite. The body was examined on May 6, 1871.

There were splenic leucocythæmia, and a large lymphoma of the spleen. The relation of the white to the red blood-corpuscles in the general circulation was 1 to 30 or 40; in the blood of the splenic vein, 1 to 10 or 15.

The animal was rather thin. The lungs were of normal extent, rather emphysematous, and strongly pigmented. On the left side were some subpleural hard bodies as large as pins' heads, which on microscopic examination were found to be bony deposits. The air-passages were normal. There was no remarkable change in the heart. Above the aortic valves, near the mouth of the coronary arteries, there was a prominence of the size of a lentil, with a rough surface, and mostly calcified: around it was distinct atheromatous thickening of the inner coat. On opening the abdominal cavity, a tumour nearly as large as a child's head was observed; it was covered

by the great omentum, lay in front of the left kidney, and proceeded from the posterior surface of the upper part of the spleen. While the spleen itself was in other parts normal, containing little blood, of a pale flesh-red colour, and moderately firm, the tumour was of soft elastic consistence, of a shining dark violet aspect, with the peritoneal investment much distended and at several points closely adherent to the omentum. On section, the tumour was found to consist of a spleniform dark brown-red tissue of slight consistence, having embedded in it numerous deposits, mostly miliary, partly whitish, partly grey and diaphanous; they differed in no respect from the normal Malpighian bodies. In some parts towards the interior, these greyish-white deposits predominated so much over the remaining tissue as to become confluent. On microscopic examination, the whole tumour showed all the elements of the normal spleen, but in place of the fine Malpighian bodies, there were large masses of lymphoid substance of similar structure. The spleen itself was remarkable for its great richness in granular blood-colouring matter and cells containing blood-corpuscles, as well as for a great amount of small and large fat-drops. The blood of the splenic vein was fluid, and of a clear red colour, and contained about one white corpuscle to ten or fifteen red ones. There was a slighter increase of the white corpuscles in the blood of the coronary veins of the heart, where the proportion was about one to thirty or forty. The liver was of a pale coffee colour, of normal size, and rather anæmic. The kidneys were of usual size; the capsule was easily removed, and on the surface beneath it were some cicatricial contractions. The substance of the kidneys was of a clear brown colour, and fragile; on microscopic examination, there was found to be marked fatty degeneration of the epithelium of the urinary tubules. The bladder was full of clear yellow urine, having a neutral reaction, and throwing down a flocculent deposit of albumen on being heated. On microscopic examination, instead of the cylinders that were expected, there were found numerous round nucleated cells, having the appearanee of colourless blood-corpuscles, and a few spermatozoa. The mucous membrane of the bladder and urethra was normal. The stomach and intestine did not present any remarkable change. There was no enlargement of the lymphatic glands anywhere.

This case of simple splenic leucocythæmia, in which, besides the large lymphadenoma of the spleen, there was only a moderate increase of the colourless blood-corpuscles, can without doubt be applied in the direction indicated above.

The disease was seized in its early stage, before it had gone on to metastasis, and to leucocythæmic disease of other organs. The remarkable amount of colourless blood-corpuscles in the urine, while the urinary passages were in a normal state, may perhaps be attributed to escape of the too abundantly formed cells into the diseased renal tissue; yet the simultaneous occurrence of spermatozoids in the urine indicates that there might possibly have been another source for these cells.

A further case of lieno-lymphatic leucocythæmia in the dog has been observed by Siedamgrotzky, of Dresden (*Bericht über das Veterinärwesen im Königreich Sachsen für das Jahr*, 1871); so that, in all, three cases of leucocythæmia in the dog have been fully described. The essential features of the case referred to were the following.

A four-year old spaniel, which had suffered for some time from loss of appetite and from diarrhœa, died four days after admission into the veterinary hospital. A large firm tumour had been detected in the abdomen by palpation. At the necropsy, the spleen was found to weigh about $2\frac{3}{5}$ lb.; it was much enlarged, and was covered with flat projections on the surface. All the lymphatic glands, especially the mesenteric, were remarkably enlarged, as were also the tonsils. The proportion of white to red corpuscles in the blood was 1 to 15. There were sanguineous effusions in the spleen, on the pericardium, in the mucous membrane of the tonsils, and on the gums.

Siedamgrotzky also describes a slight degree of lieno-lymphatic leucocythæmia as having been found in a cat which had died of internal hæmorrhage. There was remarkable hyperplasia of the lymphatic glands, and the spleen was doubled in size.

With regard to other animals, there are observations on the occurrence of leucocythæmia in pigs and horses, to which I will briefly refer.

In the pig, the following three cases have been described:

Leisering (*Bericht über das Veterinärwesen im Königreich Sachsen*, 1865) relates a case of leucocythæmia in a pig, whose spleen, liver, mesenteric glands and blood, showed corresponding changes. Further details are wanting respecting this case, which was the first observed, and was evidently one of lieno-lymphatic leucocythæmia. Fürstenberg (*Berliner Klinische Wochenscrift*, 1870) describes a case of leucocythæmia in a pig, with enlargement of all the lymphatic glands, the spleen, and the liver. The spleen was more than

two pounds in weight; the liver, which was studded with leucocythæmic deposits, weighed more than eight pounds. There was deposition of white corpuscles in the marrow of the bones. The blood was of a clear chocolate colour; the white corpuscles were enormously increased, their proportion to the red being 2 to 1.

In the case of splenic leucocythæmia in the pig to which I referred at the beginning of this article, the spleen was much enlarged, weighing $3\frac{1}{2}$ lbs. There was remarkable enlargement of the kidneys, with leucocythæmic infiltration and extensive hæmorrhages. Leucocythæmic deposits were found in the liver and lungs. There was increase of the white blood-corpuscles, their proportion to the red being 1 to 5. The blood was of a clear red colour and watery. Whether the lymphatic glands were affected could not be ascertained. Microscopic examination of the hardened organs gave the following result:—The spleen was in a state of hyperplasia, and its tissue presented exactly the same characters as in splenic leucocythæmia in man. Besides the abundant deposit of lymph-cells, there were great increase and thickening of the normal elements of the spleen. In the lungs, the chief seat of the leucocythæmic proliferations was the connective tissue sheaths of the arteries and bronchial tubes. The liver not only showed a remarkable lymphoid deposit in the connective tissue between the acini, but also in the acini themselves there was so great a deposit of lymphoid cells that their number exceeded that of the liver-cells. Finally, the kidneys were enlarged to more than double the normal size, and were studded with hæmorrhages; they contained so many lymph-cells that, under the microscope, the organ presented the appearance of a lymphatic gland, the remains of the normal kidney being discoverable at points only in the form of urinary tubules and Malpighian bodies.

A number of cases of leucocythæmia in the horse are recorded in literature; but I pass them over, as I have not been able to convince myself that they were cases of idiopathic leucocythæmia. In the mean time they all might, with greater justice, be classed among those symptomatic and transient forms of leucocythæmia which, following Virchow, we designate leucocytosis. Considering the known irritability of the lymphatic system in the horse, and the corresponding liability in this animal to inflammatory affections of the lymphatic vessels and glands, it may be supposed that such leucocytoses, which consist in a temporary increase of the colourless blood-corpuscles, are of frequent occurrence; and this is indeed observed in a host of inflammatory and other

diseases affecting the horse, such as glanders, farcy, &c. After large blood-lettings, the increase of white blood-corpuscles in the horse may go so far that the coloured and colourless corpuscles appear nearly equal in number.

The cases above related establish the complete agreement of leucocythæmia in domestic animals, especially the dog and pig, with the disease in man. The simple splenic, as well as the lieno-lymphatic and myelogenic forms of leucocythæmia, are found in these animals. This agreement extends also to the leucocythæmic changes in the liver, kidney, and lungs, and to the tendency to hæmorrhage. Hence it may be asserted that leucocythæmia, as observed in dogs, pigs, and cats, is identical with that of man; a fact which I can confirm by numerous observations on leucocythæmia in the human subject, which I was enabled to make under Buhl's direction in the pathological institute at Munich.

With regard to the etiology of leucocythæmia in man, it seems further to follow, from this agreement in character, that we must hesitate to accept as causes such conditions as syphilis, intermittent fever, &c., which certainly do not operate in animals. On the other hand, observation of the disease in domestic animals shows that certain causes of it are as yet completely hidden from our knowledge.—*London Medical Record.*

MICHELSON ON TRANSFERRENCE OF RINGWORM FROM A CAT.

Dr. Michelson (*Berliner Klinische Wochenschrift*, 1874, No. 11) relates the following interesting case:—Three children and their father and mother were found to be affected with ringworm. It appeared first on the scalp and body of the children, and was evidently thence transferred to their parents. In seeking for the primary cause of contagion, Dr. Michelson discovered that a cat with which one of the boys had been playing was the subject of scabies; and, when the crusts were examined, besides acari and their eggs, a multitude of spores and filaments appeared, which were recognised by the writer (supported by the judgment of Professor Koebner), as *Trichophyton tonsurans*. Pieces of the crusts from the cat were next bound on to the arms of three medical students. Itching soon followed, and became so violent that one of them took off the bandage, and cured its effects with balsam of Peru. The other two experimenters were rewarded by a patch of apparently

ordinary scabies, which died away of itself in ten or twelve days from the date of inoculation. One of them showed no further effects of the experiment; but the other, some weeks later, found on the place where the crust had been applied a patch of tinea circinata, which furnished specimens of the *Trichophyton tonsurans*.

The entire history (which is minutely related, and illustrated with figures of the acarus and the fungus) shows the correctness of Gerlach's conclusion, that the scabies of cats cannot be transferred to man. This does not appear, from the figure and description, to depend on a specific difference in the acarus of human and that of feline itch, but on the change of habitat. It also shows that animal parasites are very efficient carriers of epiphyta. This was well shown by the fact that scales from the patches of ringworm in the boy, which were transferred to the arm of the same person, produced no result, while the crusts from the cat succeeded. [At a recent meeting of the Société Méd. des Hôpitaux, MM. Hillairet and Besnier related cases of the transmission of herpes circinatus and herpes tonsurans to human beings from horses and from a calf.—*La France Méd.*, May, 1874, p. 801.]—*London Medical Record.*

LANDOIS ON TRANSFUSION WITH THE BLOOD OF DIFFERENT KINDS OF ANIMALS.

Some very interesting and valuable experiments have lately been made by Professor Landois, of Greifswald, to determine the changes which take place in the blood of one animal when transfused into the circulation of another of a different species. He was led to investigate the subject in consequence of the use which has lately been made of animals' blood in transfusions into the human subject; and his results are published in the *Centralblatt* for December, 1873, Nos. 56 and 57.

Dogs were injected with the blood of man, of the sheep, cat, guinea-pig, calf, pig, and pigeon; rabbits with the blood of the hare, sheep, calf, and of man; while transfusion of human blood was performed on the sheep. The frog was especially studied as the subject of transfusion of the blood of all the animals already enumerated, as well as of the pike, and the *Rana esculenta* was injected with the blood of *Rana temporaria*. The veins which run on the surface of the frog's abdomen render transfusion with an ordinary hypodermic syringe very easy of execution. It was found that if from 0·5 to 0·8 cubic centimètre of fresh or defibrinated mammalian blood were injected into the veins of a large frog, changes

rapidly occurred in it, the most marked being a dissolution of the red corpuscles, so that the frog's serum acquired a deep ruby-red lac-colour (*Lackfarbe*), from the hæmoglobin set free from the corpuscles. In transfusions with rabbit's blood, the dissolution was nearly completed in from three to five minutes, and in other animals generally in from twenty to thirty minutes. Dog's and pigeon's blood resisted the longest.

The determination of these periods was made by taking separate portions of blood at very short intervals from one of the frog's toes, the blood being put up for microscopic examination in Pacini's fluid (corrosive sublimate 1 part, pure chloride of sodium 2 parts, glycerine 13 parts, distilled water 113 parts). Some idea of the amount of dissolved hæmoglobin was obtained by comparing the tint of the frog's serum with portions of the mammal's blood experimented on, diluted with known quantities of water. Part of the hæmoglobin of the dissolved corpuscles is found in the urine of the frog in company with albumen. Frog's blood (either fresh or defibrinated) was also mixed with the blood of the other animals and examined microscopically, or else their blood was examined in frog's serum. It was then found that the red corpuscles, often after first assuming an irregular outline, and exhibiting lively molecular movements, become perfectly globular, and so appear smaller than before; they then become paler and paler, till at last only the "stroma"* remains visible, and this at last also disappears. The "stromata" often aggregate into masses, and thus can give rise to embolism and consecutive inflammatory phenomena in the circulation. Possibly the paralysis of the hinder extremities, and the weakened action of the central nervous system, which Landois has not unfrequently seen follow the injection of mammalian blood into the frog, may be due to such embolisms. If a frog be injected with serum which has been freed as much as possible from corpuscles, its urine is found for several days after to contain albumen and blood; so that in all cases of transfusion it is probable that some of the cells of the receiving animal are destroyed as well as those of the giver. But this mutual action varies much in different species, for moderate injections of serum from man and the sheep caused albumen alone to appear in the frog's urine.

The experiments in which transfusion was performed between two different species of the *mammalia* gave two chief results:—(*a*) The serum of the blood—either fresh or defibrinated—of many mammals dissolves the blood-corpuscles of

* The term "stroma" is given by Rollett to the blanched, pale, globular residue of the red corpuscle, after removal of the colouring matter.

other mammals, and of the former the dog's serum is most powerful, and the rabbit's the least. (*b*) Mammalian blood-cells vary much in their resisting power to the action of the serum of other animals, and here, again, the rabbit suffers most, and the dog and cat resist the longest; the dissolution is accelerated by warmth. Rabbit's blood injected into a dog is destroyed in a few minutes. The dissolved constituents of the blood are disposed of in two ways; they are party excreted, principally by the urine, but in smaller and uncertain quantities by the bowels, uterus, bronchi, and into the serous cavites. The other part probably goes towards the nutrition of the receiver.

As to the value of transfusion as a remedy, either for loss of blood or for constitutional anæmic conditions, Dr. Landois believes that it may benefit the receiver in three ways—(1) by bringing nutritive material into his body; (2) by the oxygen which is derived from the dissolved blood-cells and in its serum; (3) by possibly, in certain circumstances, improving the mechanical conditions of the circulation. He does not think that there is much probabilitly of the foreign blood-cells ever taking on themselves the physiological functions of those of their receiver—at any rate where the two species stand a little way apart in the scale of nature—but he has no data on which to found a certain opinion with regard to very closely allied species.

Albumen and hæmoglobin are found in some cases in the urine as early as one hour and three quarters to two hours and a half after transfusion, and their excretion lasts twelve hours or more. In consequence of the partial destruction of the cells of the receiver's blood by the foreign serum in some animals (*e.g.*, the rabbit), symptoms of great severity and danger may occur after the operation, such as immensely quickened respiration, dyspnœa, convulsions, and even death or asphyxia may follow it.

Portions of test blood, taken at different intervals from animals in such conditions, show all stages of dissolution of the corpuscles, and the urine becomes bloody and albuminous if life is sufficiently prolonged. In animals whose corpuscles have great resisting power (*e.g.*, the dog), these phenomena do not appear, the foreign serum itself undergoing change before it had time to act.

Death may occur, after copious transfusions, from the rapid massing together of the foreign (or the animal's own) blood-cells, which leads to extensive coagulations of fibrine in the vessels; and many kinds of blood exhibit the phenomena that when mixed with other blood their corpuscles aggregate into

masses, which may give rise to capillary embolisms in the lungs. The danger of transfusions into the blood of different animals, therefore, depends on the relation of the species employed.

As a sort of appendix to Dr. Landois' experiments, we should like to record here some cases of actual transfusion of *lamb's* blood into the human subject, published by Dr. Hasse, of Nordhausen (*Tagesblatt der* 46 *Versammlung, Deutscher Naturforscher;* Wiesbaden; No. 7, 1873). Interesting in themselves, they derive additional interest from the light which Dr. Landois' researches throw on some of their phenomena, and they afford an indirect confirmation of his statements of a striking nature. The cases are twelve in number, and distributed as follows:—Five were phthisis, two chlorosis, two cachexia after severe illness, one cachexia with caries of the vertebræ, one carcinoma ventriculi, and one placenta prævia with severe hæmorrhage. This last case recovered rapidly, the two cases of general cachexia recovered gradually, and the chlorotic patients only very slowly. The patient with carcinoma was temporarily benefited, and the one with spinal disease improved in general health and had less suppuration. The results in the phthisical cases were wonderfully satisfactory (*enorm günstige*).

The reaction following the operation was very violent. There was marked dyspnœa, which even amounted nearly to apnœa, and necessitated interruption of the operation after sixty to ninety seconds. Half an hour after there was a violent rigor, and the temperature rose to 40·9° C. (105·6° Fahr.), and then deep sleep followed, and on waking there was a feeling of comfort experienced. The patients quickly gained several pounds in weight, and their muscular strength and mental energy rapidly improved. In a few cases there was a slight excretion of albumen and the colouring matter of the blood in the urine. Does not Dr. Landois give the key to the dyspnœa and to the condition of urine here described?—*London Medical Record.*

CONSULAR REPORTS UPON AGRICULTURE.—THE TURKISH DOMINIONS.

Next to agriculture, sheep-farming forms the most important element of native industry, and its results constitute the second largest item in the local revenue in the consulate of Koordistan. But, unlike agriculture, its development has been progressive, and the pastorals have been enriched by the stimulus of foreign capital, which is imported directly

for the purchase of animals for slaughter, wool, mohair, skins, and butter, by Syrian, Egyptian, Constantinople, and European traders, to the extent of £200,000 annually for the two vilayets comprising this consulate. It is entrammelled, too, by the unbridled rapacity of tax-farmers exacting dues in kind: an invariable animal tax of two piastres in cash—a tithe, in fact, calculating the yearly produce of the animal at twenty pias—being charged on every full-grown sheep. Sheep-farming by townspeople of Erzeroum is pursued under a variety of agreements—each one dependent upon the means of the owner—but all closely resembling the "métairie" system of the South of France. Capitalists at a distance from the purely nomade and pastoral ranges, generally adopt what is, in the locality, called the "Kome" system. On this system they are supposed to have purchased a pasture, affording ample grazing for 800 sheep in spring and summer, and yielding them a sufficiency of cut-dried fodder for winter, together with the rude mud buildings for housing animals in rigorous weather, and a cabin for the shepherd. The above number of sheep are under the charge of one shepherd, assisted by two boys paid by him, and four dogs to guard the flock. All labour connected with it, manufacturing the produce and rendering it fit for the market, is compulsory in the shepherd, who therefore tends and milks the sheep, churns, makes the cheese, washes, shears, and doctors the animals; but the grass necessary for winter use is cut and stored at the expense of the proprietor, who pays 1500 pias (£13 12s. 8d.), or 1½ pias per day for each animal every season. Additional expenses defrayed by the latter annually are—for salt, medicines, 1 pias per head, and the usual tax. Besides occasional epidemics, rare, which in some years have destroyed 70 per cent. of the flocks, the other diseases to which sheep seem periodically liable are the strangles, mange, maggots in the head, and kargun, a malady more peculiar to goats, which begins by violent sneezing, after which the body swells, and the animal dies shortly after. The general average per-centage of mortality from all these diseases is 10 per cent. per annum—a low rate considering the total want of care animals are subject to, and entire ignorance of anything like veterinary skill on the part of the shepherd, who alone treats them when ill. Ewes are only kept till they have entered their fifth year, and have dropped three lambs, when they are called "kisser" or barren, and are fattened for sale. The shepherd receives no money wages, but derives certain perquisites in kind annually in the number of sheep in his charge. The proportion of male and

female births is three fifths and two fifths respectively. The latter are, of course, kept for breeding and produce; the former are fattened on dry lucerne, and sold in July or August, after completing their second or third year, for 10s. to 14s. 6d., according to age, to the butchers. The sheep get no other food than green grass during spring, summer, and autumn, and the same dried into coarse hay during winter. The proprietor then begins farming, with a capital of £600, with which he buys 800 sheep, with sixteen rams, and a pasture ground sufficient for his flock. According to calculations given in accounts for three years by Consul Taylor, it results that a profit of £610 accrues for the three years' sheep-farming, or more than 25 per cent. per annum on the original capital, this exclusive of the value of the stock for further operations—namely, 584 four-year-old ewes; 202 three-year-old and 245 two-year-old. Sheep-farming in the Diarbekr districts is not so expensive as in the neighbourhood of Erzeroum, but the profits are less, owing to higher taxes, comparative distance from large markets, inferior quality of pasture and greater heat of climate, which lessens and deteriorates the produce. There the Koords, inhabiting the chains and slopes of Mounts Taurus and Maisins, permit flocks of 1000 each to range at will in their localities, on the payment of a fee, for summer and autumn: during winter and spring they are pastured in the great Mesopotamian plains at the foot of the above mountains, subject to a trifling fee to the Arab chief of the district. The most productive farming in these districts is that of the Miraaz goat, yielding mohair, on account of the greater value and demand for its produce. The quality, although it cannot compare with that of the Angora or Castamouni goat, ranks next, while the demand for it is greater year by year, in spite of inferiority, from greater comparative cheapness. If kept entirely in the plains, each goat gives 300 drachms of hair yearly; if partly in the plain and partly in the mountain, 250 only; or, taking very low average seasons, 10 maunds or 16 lbs. 10 ozs. for every 100 goats—that is, 240 drachms per head. These animals, costing on an average 9s. 1d. each, require no more care than sheep, the only extra fodder supplied them being, if they remain during winter in the mountains, dried oak leaves, collected and stacked in several convenient localities about their walk by the shepherd, at no charge to the proprietor. It is stated, however, that the kargun disease causes great mortality occasionally among them. Consul Taylor enters thus fully into the particulars of these branches of native industry because they alone seem the sole real paying occupations

adapted to Europeans in Armenia and Koordistan, the profits derived from them being, generally speaking, with ordinary care and attention, the steadiest and most lucrative; they are, therefore, best worthy the attention of small home capitalists. The scales of profit given are the results of the most primitive careless farming imaginable, and no professional attempts have ever been made to alter it, or to improve breeds and consequently produce. A proper selection of animals, therefore, and the admixture of good foreign blood, coupled with the experience in such matters of Europeans practically acquainted with all the details of such occupations, would naturally materially increase the profits given, and result in articles more fitted than at present for the European market. The country best suited for proposed emigrants would be the highlands and slopes of Mount Taurus and Masino, between Saert Mardin and Jezireh, on the Tigris, and the edge of the great Mesopotamian plain that skirts their foot in that direction. The climate is salubrious and water abundant, nor are there any great hardships or privations to endure sufficient in themselves to prevent a sober, prudent man enjoying the same health there as in his native climate. The only drawbacks are the same that constitute the real obstacles existing to all commercial activity and foreign enterprise in these rich interior provinces. They arise, dismissing the subject of the roads, from the imperfect dilatory administration of law, and the total want of anything like social organization among all classes of agricultural, pastoral, and nomade people, anyway removed from the provincial head centre. The foreign immigrant, therefore, would have to rely mainly upon himself, and gain the confidence of half-civilised people with whom he would come in contact, standing aloof entirely from all Government officials. Subsequent experience, tact, fair and generous dealing with the pastorals and nomades about him, would then surely, though by degrees, exact from them the amount of security requisite for the success of his undertaking, which the actual nominal ruling powers would never be able to guarantee him.

From the report made by Consul Stuart, we learn that a few years ago the agricultural stock and produce of Epirus were roughly valued at £1,600,000 a year; the contribution to the imperial chest, in round numbers, at £400,000, or 25 per cent. of the whole. The population was reckoned at 360,000, which figures were probably a fair approximation about fifteen years ago. Since then, however, the population has been constantly diminishing; and so far as private researches can be relied on it may be stated at about 313,750.

But not only the population, the agricultural stock is also diminishing. In this country neither machinery nor the wheeled carriage is employed in aid of labour. The ox is used for ploughing, &c.; the pack-horse for transport. Both are falling off as well in quality as in number. During the British protection of the Ionian Isles, the farmers of Epirus used to obtain supplies of large powerful Vallachian oxen through commissariat-contractor's droves. This they can no longer do. The Vallachian ox has almost disappeared from Epirus, and all the ploughing is now done with the small country ox, which is small, light, and of feeble draught power. But even of these the breed is declining. When the English were in the islands, large numbers of them used to be fattened for the Ionian markets, which led to some attention to the breed, and consequently to some improvement. Now, however, that there is no such demand for them, they are bred without care or selection, and only in such numbers as are absolutely necessary for agricultural purposes. In 1861 it was calculated that there were 29,000 head of horned cattle in Epirus. A large subtraction must now be made from that number. The herds were, not many years ago, well thought of. Though small, they were hardy, strong, and active. Numbers of them used every year to be brought up for the Ionian Islands and Continental Greece, as well for the country work as for the saddle and light carriage. For the demand occasioned by the Crimean War, some thousands of the best were exported. The deficiency thus created has never been supplied, and from that time dates the deterioration of the breed, which every year becomes more observable. Of the common run of horses now bred in the country, few would fetch £5 at a fair in England; perhaps not one, £10. In 1861 it was made out that there were 13,000 horses and 4000 mules in Epirus. Well-informed persons are of opinion that both are now less numerous by at least a fourth. With a declining population, in which the female sex forms a large and relatively increasing majority, and with a falling off in the animal power which is employed in aid of labour, it follows almost of necessity that there is a corresponding falling off in the produce of the country. For here no working farmer will burden himself with more land than he can make use of; and there is a conventional limit both of day and season work which is rarely exceeded by man or beast. Before proceeding further, notice may be taken of the flocks which form one of the staples of the country's wealth. Last year the tax on sheep and goats was 3 pias a head, and it yielded,

according to official statement, 5,720,000 pias. It was levied directly, and the Government was careful to ascertain the number of the flocks. Judging, therefore, by the produce of the tax, there were in Epirus 1,907,000 sheep and goats collectively, of a year old and upwards. In 1860 the tax was 2 pias a head, and sold by auction, it fetched 5,190,000 pias, which would give 2,590,000 sheep and goats of a year old and upwards. But to this figure a considerable addition must be made; for the tax-farmer, in estimating the number for which he bids, always leaves a good margin for profit. Taking it, however, as the correct number, it still shows a declension of about a fourth in this branch of the country's resources. No means exist for procuring anything like correct information with respect to agricultural or industrial produce. No statistics are ever attempted; and as there are many motives for concealment, all inquiries on the subject are studiously evaded or misled. But though this is and always has been the case, certain general conclusions can be arrived at by observation and by the collection of such loose data as are currently known. As regards observation, it is obvious to every one acquainted with the country that the breadth of land under tillage is from year to year becoming less; and as the mode of husbandry does not improve, it would follow that the amount of produce diminishes in proportion. The opinion is general that the produce of the country is diminishing, and in a ratio, too, which exceeds the decrease of the agricultural population. For in many places the hands are still there, but the means of tillage are wanting: no cattle, no seed, no money, no credit. The land-owners, who are sharing the general poverty, cannot, as in other times, make loans or advances to their villagers; and the money-lender, seeing their condition, avoids dealing with them. Under these circumstances the work of agriculture becomes impossible; and the villager, leaving his plot of land fallow, tries some other way of finding subsistence. He seeks employment as a shepherd; or if he has the good fortune to possess a few sheep or goats, he devotes all his care to them, in the hope of raising a flock numerous enough to support himself and family. But few, however, are in so favorable a position; and in many districts the peasants are reduced to great distress. It is credibly reported that in some places they are in want of bread, and are forced to live on wild herbs, roots, and other unwholesome and insufficient food. Hence an unusual mortality among them, and the appearance of new and strange diseases previously unknown in the country. Nevertheless, with all

this, the Government bates nothing of its claim on the land, the tale of bricks is not diminished, and the attempt is rigorously made to exact not only current charges, but arrears extending back over many years. To those who cannot pay is applied the law made for those who can but will not—to wit, first, fifteen days' imprisonment, failing which, seizure and sale by auction of the defaulters' personal chattels, agricultural impliments excepted. If the proceeds of the sale do not cover the defalcation, the balance is held over to a future time, but remission is never made. This law is absolute: the exercise of it is often attended with circumstances of great hardship and oppression; and nothing is more dreaded by the villagers than the visits of policemen sent out to collect arrears of taxes. The present Governor-General, Sahfet Pasha, is said to be a very strict Mohammedan. He has a mosque fitted up in Government House, where he attends prayers regularly five times a day, and obliges his officials to do the same, under pain of dismissal. He holds but little intercourse with the foreign consuls in the place; and in his general deportment he is said to act, as nearly as present times will allow, the Turk of a byegone age. In all this his example is more or less imitated by the Mussulmans of every class in the community. They are more distant and reserved towards Christians than they used to be; and though sensible of their increasing poverty, they would still, in some way or other, maintain or assert the superiority accorded to them by their religion. As they seem to be incapable of retrieving their sinking state, one is tempted to believe that they are bent on obstructing all progress among the Christians, and thereby of keeping them as much and as long as possible in a condition of inferiority. If there is any such motive in the spirit and policy of the governing party, the continued decay of the country is inevitable.

Analysis of Continental Journals.

By G. Fleming, M.R.C.V.S., Royal Engineers.

DENTAL CYSTS.

In the *Gazetta Medico-Veterinaria* of Milan for 1873 (p.274) Professors Lanzillotti Buonsanti and Generali, of the Veterinary School of that city, published a most complete and interesting contribution to our knowledge of the pathology

of dental cysts in the horse (*Contribuzione alla Patologia delle cosi dette cisti dentaire dell Cavallo*), well illustrated with woodcuts, and including a very full bibliographical record and synoptical table of these morbid productions. From their researches it would appear that these dental cysts have only been described since the commencement of this century,* the first case recorded being by Mage Grouillé in 1811. Since then many observations have been published, but with one exception they all referred to those witnessed in the horse, the only case reported in any other animal being seen in a lamb.

These teeth-bearing tumours have received different names, often due to the idea the various observers entertained as to the formation of these morbid productions. Thus they have been designated "erratic" or "misplaced teeth," "dental neoplasies," "odontocysts," "dentinal degeneration of the temporal bone," "temporal fistula," "abnormal development of teeth in unusual places," auricular teeth," odontocele" (and "dentigerous cysts" or "teeth tumours").

At first, and indeed until within a comparatively recent period, the greatest mistakes were made with regard to the nature of these tumours. Rodet, for instance, in 1827, in a fistula at the anterior margin of the ear of a horse, found what, from his description, could be nothing else than a tooth, but the production of which he attributed to "eburnisation" or degeneration of the bone. Perosino (*Il Medico-Veterinario*, 1868) subsequently followed Rodet in describing a tooth he extracted from a fistulous opening at the base of a horse's ear, as a "dentinal transformation of the temporal bone." Martin (*Journal de l'Ecole de Lyon*, 1853) had under observation a horse that, for fifteen months, had a fistulous tumour in the temporal region, and which on an operation being performed yielded a molar tooth; he nevertheless designated the case as "ossification of the scutiform cartilage, with necrosis of the newly formed bone." And Harold (in the *Veterinarian* for 1845, p. 133) in an article entitled "Singular Removal of a Bony Calculus," is alluding to a cyst of this kind.

A careful study of these tumours in recent times shows that they may be developed in most unusual regions. These are—the temporal region, the base of the ear, testicles, ovaries, frontal bones, the space between the branches of the lower

* No mention is made of the Λίδοιγενομένοί ἐν τοῖς γνάδοις or maxillary exostoses of Apsyrtus ('Hipp. Gr.,' p. 64), who recommends that these tumours should be carefully and completely removed, or they will return of a larger size.

jaw, and the lumbar region. Colman stands alone in his case of a tooth found above the right kidney; though the Milan professors think that in this instance the tooth may have been developed in a testicle retained in the abdominal cavity. The most common situation is undoubtedly the temporal region; as in the seventy-five instances recorded, no fewer than sixty-eight were observed there. Of the remainder, besides Colman's, one was in the intermaxillary space, two in the testicles, and one in the frontal bone.*

Berger-Perriere (*Recueil de Méd. Vétérinaire*, 1835, p. 586) found a temporary incisor in a fistulous wound near the right ear of a lamb two and a half months old.

The temporal dentigerous cyst is characterised by the presence in this region of a hard, and not very voluminous or painful tumour, which has usually a fistula in its centre, from which flows a white viscid pus that soon dries on the surrounding skin. A probe introduced into the fistula gives the sensation of a rugged hard body, and more or less movable, which is nearly always supposed to be necrosed bone; but except in three instances, the practitioners have rectified their diagnosis after operating, and recognised the production as a molar tooth.

In most instances only one tooth is found in these cysts, but occasionally more are present. Gurlt was the first to observe, on the mastoid portion of the temporal bone, a mass of molar teeth fused, as it were, together; the tumour was three and a half inches high, and about two inches in its

* In 1865, while stationed at Aldershot, I was driving one day in the neighbourhood of Farnborough, when, in a narrow lane, our progress was rather checked by a farmer's waggon in front, which compelled us to travel at a walking pace for some distance. My attention during this delay was attracted to the shaft horse, a brown animal, which had an enormous tumour on the right side of its face. This tumour had such a singular appearance that I dismounted from the carriage and induced the driver of the waggon to halt, while I inquired into the history of the case and made an inspection of the tumour. The latter was as large as one half of a good-sized cocoa-nut, occupied pretty nearly the whole side of the face, and was literally a mass of what at first appeared to be fragments of bone, but which on a closer examination proved to be imperfectly developed molar teeth. The entire tumour looked as if it were composed of these. I was informed that, when two years old, the horse had taken fright and run away; and on trying to get through a gate a wooden stump ran into its face, making a large hole. This filled up, the tumour gradually formed on it, and since that time these "bits of bone," as the waggoner called them, were constantly shed from its surface. The growth was so considerable that the collar was passed over the head with difficulty. I was so much interested in the case that I afterwards offered to keep the animal while the removal of the tumour was attempted, but the farmer could not spare it from work at the time, and I did not have another opportunity. Probably some veterinary surgeon in the locality will remember the case.

largest diameter. The horse had been destroyed for glanders, and during life had been affected with a fistula at the anterior margin of the right ear ("*Ueber abnorme Zahnbildugn am Schläfbeine des Pferdes*," Magazin für Thierheilkunde, 1851, p. 99). Goubaux has found two at the posterior portion of the sphenoid bone ('Recueil de Méd. Vét.,' 1854, p. 70), and Bay four ('Annales de Méd. Vét.,' 1869, p. 226). In a cyst of the testicle, Gurlt discovered six teeth—three separate and three in a mass (*Magazin*, 1851, p. 214); and Colman, in a similar case, two molars and an incisor.

Age does not appear to have any influence on the development of these cysts; that of the animals in which they have been observed ranging from eight or nine months (Tyvaert) to fifteen years (Eichbaum). The period of formation also varied greatly. With regard to the side of the body on which they were developed, in seventeen cases they were on the left, and in thirteen on the right. In fourteen cases observed by Macorps they were indifferently on both sides. In this respect clinical observation has not yielded any fact of practical importance.

Sometimes, after the extraction of the tooth, it happens that the cavity of the cyst or the bottom of the fistula does not cicatrise, notwithstanding recourse to the most energetic measures, such as cauterisation, tincture of iodine, etc. This delay in cicatrisation is a sure indication that the development of a new tooth is taking place. Rodet, so long ago as 1827, had noted this fact, and explained it according to his notions with respect to the nature of the cyst, which he thought was due to an "eburnification" of the bone, and that a new ivory tumour (tumeur éburnée) appeared after the extirpation of the first. Macorps has observed a case of this kind; within three months he was compelled to operate twice, each time removing a molar tooth, and when he made his report in 1860, it was probable that another, the third, was being developed, as the fistula had not closed, notwithstanding active treatment.

The majority of horses affected with these dentigerous cysts do not appear to suffer in any particular way, and some do not appear to be at all inconvenienced. Macorps and Gamgee have remarked, however, that mastication was difficult and loss of condition marked. Rarely is there much pain in the temporal region, unless pressure is unduly made by the head-collar or bridle. In the case mentioned by Harold the pain was insignificant.

A case of exceptional gravity is that described by Bay. In 1860, this veterinarian was called in to see a horse suffering

from what appeared to be encephalitis, and which died in twenty-four hours. It had always shown, on the right temporal region, a tumour without a fistula; but this did not attract any notice, as it apparently caused no inconvenience. At the autopsy a hard tumour was observed on the cranium, corresponding exactly to that which had been noted previously, and extending to the interior of the cranial cavity. This was supposed to be an exostosis, and believed to be the cause of the animal's death. It was only nine years afterwards, when preparing the head as a pathological specimen, that Bay, to his great surprise, discovered this supposed exostosis to be constituted by the union of four molar teeth. The two superior of these projected from the temporal articulation, forming a considerable prominence in the temporal fossa, and the inferior two, more considerable, were situated in the petrous portion of the temporal bone, inclining obliquely from within outwards. The posterior portion of the latter projected in a very salient manner at the *sella turcica*, and must have produced much pressure on important parts of the brain.

It is probable that in many of these cases in which the temporal cysts exist, compression is made on the auditory canal—a result which may not be recognised during life.

The mode of extracting the tooth from the cyst varies according to its degree of adhesion to the bone on which the cyst is situated. If the mobility of the tooth is marked (as was the case with an animal operated upon by the Milan professors), ordinary forceps will suffice for its extraction, but in other instances a gouge and mallet, scalpel, &c., may be necessary. Coclet describes the following method of operating as that which he has tried with advantage. After exposing the dental cyst, and isolating it from the surrounding textures, he passes a metallic wire in the shape of a noose around the base of the tumour, rolling the free portion of the wire round a piece of wood. By making strong traction on this ligature by means of the wood, the cyst with its osseous peduncle is extirpated. The professors, however, think that in the majority of cases the tooth may be easily removed by suitable forceps.

The case which came under their own observation is carefully described. The cyst was seen in a foal twenty months old, at the base of the left ear. It had been purchased two months previously, and on the third day after, a small hard tumour was observed in the temporal region, with an opening in the centre, from which continually escaped a small quantity of white viscid pus that soon encrusted around

the aperture. This case had been treated in a variety of ways, but without effect, and it was finally placed in the hands of the professors. They found a fistulous, indurated, and swollen opening into which a probe readily penetrated to a depth of four centimètres until it came into contact with a hard movable body; and the diagnosis was naturally limited to the probability of a dental cyst or necrosis of the temporal bone. The absence of sanies or altered pus, and gritty sensation when exploring the fistula with the probe, were in favour of the first probability. So it was resolved to operate as if for the extraction of an erratic tooth. A T-shaped incision was made instead of a crucial one, to avoid a needless lesion at the base of the concha, and the tooth was extracted with common forceps.

At the bottom of the fistula was observed a little cavity corresponding to the lower end of the tooth. This was dressed frequently with tincture of iodine, which brought about a cure in twelve days. The tooth, though irregularly shaped, was at once recognised as such; it adhered to the temporal bone by its root, and its table corresponded to the fistula. Four figures of the tooth in its entirety are given, and these are accompanied by an excellent description; with another figure showing the histological features of a section (vertical), and another figure to illustrate the development of the teeth. The professors remark that of those who have met with these cysts, few have studied the teeth extracted therefrom with regard to their histological characteristics and chemical composition, the majority confining themselves to the larger features of the cases. Macorps, Gamgee, Lafosse, Oreste, and Falconio have certainly gone beyond the latter, and particularly Oreste and Falconio, who were at the time they described their case (1868) professors at the Naples School.

Lanzillotti-Buonsanti and Generali took advantage of the opportunity offered them to make a minute inspection of the specimen, and they report that, microscopically, the structure of such teeth does not differ much from those implanted in the alveoli of the jaws. The same constituents —cementum, dentine, and enamel—were found, the only difference being that these were arranged in an unusual manner. In this tooth, for instance, the cementum was particularly abundant in the central part, while in that studied by Oreste and Falconio the dentine was most abundant, and the cementum least in quantity.

To judge by the descriptions roughly given by some practitioners, the dentine would appear to be usually the most

abundant constituent: a circumstance which has led to the error that the tumour was an "éburnée" degeneration of the bone.

The opinions given by different authorities as to the nature of the dental cysts, are in general somewhat varied; and some are quite erroneous, as they have considered the abnormal development of these teeth from too exclusive a point of view; a circumstance which has occurred in human as well as in veterinary medicine. While some observers have looked upon the cysts as parasitic productions, others have believed them to be merely heterotopical neoplasies, and a small number have considered them as misplaced teeth. The error of each of these opinions lies in the fact, that the reporters have only considered the cysts of one region, and have generalised their theory so as to make it applicable to the cysts developed in other parts of the body.

Taking into equal account the different cases of abnormal development of teeth in different parts of the body of men and animals, the professors think themselves authorised in making the following distinctions in the dental cysts:

1 A certain number of teeth may be sometimes developed as parasitic productions in a cavity similar to that of the mouth, and situated near that aperture. In this category is included the excellent case occurring in a woman, and described in 1862 by Professor Guiseppe Generali ('Memoire della R. Accademia delle Scienze di Modena,' vol. iv, 1862), an observation unique in the teratology of mankind. This was a case of a parasitic monstrosity. The designation of "dental cyst" (*cisti dentaria*), so inexact in itself, is in such a case inappropriate and false.

2. The ovarian cysts in women, in which have been found pieces of bone and cartilage, teeth, and a lower jaw more or less deformed, ought to be considered as probably cases of ovarian impregnation with an incompletely developed fœtus; and in young girls, as examples of the intra-uterine formation of a fœtus within a fœtus. Only in this way can be explained the lipomatous and sarcomatous congenital masses contained in cysts, with the teeth and fragments of bone simulating an incomplete jaw, which have been observed on the human orbit (Lobstein and Travers); on the palate (Otto); on the tongue (Stansky); on the side of the jaw, in the cheek, and on the neck. But, according to the observations of Bernard Schultze and Panum, these should only be considered as the simple proliferation of embryonic plasmatic cells. To this category also belongs the cyst found by Coleman beneath the right kidney of a horse, in which were

discovered two small molars and an incisor attached to a portion of bone that had some resemblance to a jaw.

3. Some dental cysts are true dermoid cysts which contain hair and teeth. Such are those found in the testicles and ovaries, the cyst discovered by Gurlt between the two branches of the lower jaw, &c. There is no necessity for insisting upon this fact, since the classical researches of His have demonstrated that the testicles and ovaries are derived from the external blastodermic layer, contrary to the theory of Remak.

4. The dental cysts of the upper or lower jaw, the teeth found in the maxillary sinuses of man and the horse, and the four teeth observed by Vives on the inner aspect of the inferior maxilla of a pig, at four centimètres from the lower border of the dental arcade—these, and all similar cases, we may consider with Virchow ('Pathologie des Tumeurs,' Paris, 1869), some as cysts by retention, in consequence of a periostoses; and others as dental aberrations (*dislocazioni dentarie*). It would be inexact and indefensible to generalise this idea, and apply it to all the other cases of abnormal development of the teeth.

5. It is always difficult to give a satisfactory explanation with regard to the dental cysts in the temporal region, which are the most frequent. The Milan professors think that there exist positive proofs to enable them to say to some authorities (Fuchs, Derache, Degive, Robin and Felizet, &c.), that there are heterotopical dental neoplasies, and to Virchow that they ought to be classed among the dental aberrations. They may also as well be heterotopical neoplasies as dermoid cysts, as up to the present time no one has found hairs with the teeth, nor anything except aberration of situation. Perhaps direct researches, which have not yet been made, carried out in favorable circumstances, will better serve in deciding their real nature than all the more or less brilliant academical reasoning.

TRANSMISSION OF TINEA FAVOSA BY A CAT AND RAT.

In the *Lyon Médical* (No. 21), M. Horand gives an account of two cases of transmission of *Tinea favosa* from the lower animals to mankind.

A girl, fifteen years old, had a cutaneous eruption on the outer side and back of the left hand, as well as towards the clavicle on the same side. An examination of the scurf and crusts from the centre of the patches revealed the presence of the *Achorion*, proving that the eruption was *Tinea favosa*. In investigating its cause it was gathered that one of the

mistresses of this young girl was also affected with a similar eruption, and a microscopic inspection of the matters obtained from it established the fact. It was then ascertained that a cat in the house, which was often caressed by the two patients, had been attacked some time previously by a crusty outbreak on its left ear and right fore paw. There was still a little crust on the latter, and when a portion of it was submitted to microscopical scrutiny fragments of the *Achorion* were readily found. Horand clearly established the transmission of the disease from the cat to the people, but how did the animal obtain it? From a rat, replies Horand; and this source is very probable, if not absolutely certain, as he then gives an interesting history of a woman who contracted *Favus* through introducing her hand into a rat-trap in which there had been a rat that had favous crusts on its head.—*Annales de Méd. Vét. de Bruxelles.*

LIVERPOOL VETERINARY MEDICAL ASSOCIATION.

The Liverpool Veterinary Medical Association held its fortieth quarterly meeting on Friday, 14th August, in the Medical Institute, Liverpool.

The President of the Association, Mr. Morgan, being unable to be present at the commencement of the meeting, Mr. Storrar, of Chester, took the chair.

There were also present—Messrs. Heyes, Reynolds, Morgan, Wilson, Simpson, Kenny, Ackroyd, Harwood, William Elam, J. Leather, W. Leather, Cave, Duff, Summner, Fenton, and Bell, Liverpool; P. Taylor, Tom Taylor, W. A. Taylor, Hopkins, Roberts, Greaves, Falkener, Watson, and Ogden, Manchester; H. Cartwright, Wolverhampton; W. A. Cartwright, Whitechurch; J. and D. Storrar, Chester; Dobbie, Birkenhead; Wall, Warrington; Whittle, Worsley; Wood, Wigan; Taylor, Oldham; Lowe, Bolton; Dacre, Altringham; Barnes, Malpas; Roberts, Owestry; Edwards, Abergele; Welsby, West Derby; W. C. Lawson, Woolton; Barron, Sutton; and several other gentlemen whose names we omitted to obtain.

The subject for discussion was by Professor Williams, of the Edinburgh New Veterinary College, on "Pneumonia in the Horse."

Professor Williams, on rising, was very warmly received by the meeting, which he duly acknowledged.

The paper, a very able and interesting one, occupied up-

wards of an hour in delivery, and entered very minutely into the pathology of pneumonia, the various changes that take place, together with the symptoms and treatment of that disease.

The discussion which followed was principally on the treatment of the disease, and brought out the extraordinary great diversity of opinion that exists on this subject. Some members advocated bleeding, blistering, &c., while others agreed with the Professor that such a mode was more likely to cause a fatal termination than the soothing system, viz. quiet, pure air, warm water to the sides, free access to water, warm bandages and body clothing, doses of nitrate of potass, and tincture of aconite.

The principal speakers were—Messrs. Reynolds, Leather, Heyes, J. Taylor, W. A. Taylor, Greaves, Wilson, and Cartwright.

A hearty vote of thanks was accorded to Professor Williams for his great kindness in coming such a distance, and affording the members such an intellectual treat.

In the course of the discussion it was incidentally mentioned that this was the second occasion on which Professors had honoured the Veterinary Medical Associations by reading a paper, and both had been at Liverpool.

In the evening the members dined at the Adelphi Hotel; the President, Mr. G. Morgan, in the chair; Mr. R. S. Reynolds, Vice-President, in the vice-chair. A capital dinner was supplied, and, with toast and song, a very pleasant and agreeable evening was spent, between forty and fifty gentlemen being present.

C. W. Elam,
Hon. Sec.

ORDER OF COUNCIL.

At the Council Chamber, Whitehall, the 7th day of August, 1874.
By the Lords of Her Majesty's Most Honourable Privy Council.

Present: Lord President, Lord Sandon.

The Lords and others of Her Majesty's Most Honourable Privy Council, by virtue and in exercise of the powers in them vested under The Contagious Diseases (Animals) Act, 1869, and of every other power enabling them in this behalf, do declare and order, and it is hereby declared and ordered, as follows:

1. This Order may be cited as The Animals (Amendment) Order of 1874.

2. In this Order the Act of 1869 means The Contagious Diseases

(Animals) Act, 1869; and words in this Order have the same meaning as in that Act.

3. The Foreign Animals Order of 1871 has and shall have effect subject and by way of supplement to The Animals Order of 1871; and nothing in The Foreign Animals Order of 1871 interferes or shall interfere with the execution or discharge by the Local Authority, or the inspector or other officer of the Local Authority, of any power or duty conferred or imposed on them or him by the Act of 1869, or by any Order of Council.

4. Regulation Seven of the Fourth Schedule to the Act of 1869 shall apply in every case where a vessel comes into port having on board foreign animals maimed or injured on the voyage; but, notwithstanding anything in Section Nineteen of the Act of 1869, any animals being at any time within any such port shall not be deemed foreign animals, by reason only of anything in this Order.

5. The Order of Council of the 30th day of June, 1873, relating to glanders and farcy, shall have effect as if in Article Two thereof the word glanders were substituted for the words contagious or infectious disease. (Signed) ARTHUR HELPS.

EDINBURGH VETERINARY COLLEGE.

WE learn that the following appointments have at length been made in the Clyde Street Veterinary College, after many strong debates at the meetings of the trustees of the Dick Fund:—

Principal of the College and Lecturer on Comparative Pathology and Anatomy .	Mr. THOS. WALLEY.
Lecturer on Veterinary Medicine and Surgery	Mr. BRANFORD.
Clinical Instructor	Mr. COLIN C. BAIRD.

The Chair of Physiology will probably be filled by Dr. McKENDRICK.

The services of a Demonstrator to assist the Principal have yet to be obtained.

In ending this announcement we cannot refrain from expressing our regret that no means have yet been found for consolidating the several Scotch Schools, and bringing about that peace and harmony which are so nccessary to the welfare of our Scottish brethren in the profession.

We add to these remarks the following report of a meeting of the trustees, extracted from the *North British Agriculturist*:

A meeting of the trustees of Professor Dick was held in the Council Chambers on Monday, August 17th; the Lord Provost in the Chair.

The Professorial Staff.

The following were submitted:—(1) A letter from Mr. Brandford, of 6th inst., accepting the appointment of Professor of Veterinary Medicine or Surgery in the College. (2) A letter from Professor Walley, of 10th inst., declining to accept of the appointment to retain the Anatomical Chair, and to be Resident Professor of the College. (3) A letter from Dr. Young, of 13th inst., resigning the Chair of Physiology in the College.

The *Clerk* stated that the letter of resignation from Professor Walley was virtually withdrawn. The Committee of Management had agreed that the resolution in these circumstances that should be submitted to the meeting of trustees should be:—"Having heard the views of the Committee of Management, the trustees resolve—First, That the appointment of Mr. Walley as Resident Professor of the College be cancelled, and that, in addition to his office of Professor of Anatomy and Comparative Pathology, Mr. Walley be appointed Principal of the College. Second, That Mr. Colin C. Baird, V.S., be appointed to give clinical instruction to students in the yard at the College, with assistance of the professors, and to take charge of the forge, and to enable him fully to do so, that he shall occupy, free of rent, the dwelling-house at the College. Further, that Mr. Baird be allowed to practise his profession of veterinary surgeon in the College premises. Third, That the trustees accept of the resignation of Dr. Young of the Chair of Physiology in the College, and appoint Dr. McKendrick to that chair. Fourth, That these several appointments shall in the mean time be conditional until a satisfactory arrangement is made between the Committee of Management and the parties concerned, and shall thereafter continue in force during the pleasure of the trustees, and subject to such rules and regulations already made, or that may hereafter be made, by the trustees for the management of the College, and the conduct of the veterinary practice therein. Fifth, That it be remitted to the Committee of Management, with powers, to carry these resolutions into effect; to alter, in so far as is necessary, the existing rules; to adjust and promote agreement with the several professors, and to adopt all measures necessary for conducting the College efficiently during the ensuing session—the committee report their proceedings from time to time to the trust."

The *Lord Provost* moved that the resolutions read by the Clerk be agreed to.

EDINBURGH GRADUATES.

The quarterly dinner of the Edinburgh University Club in London was held at St. James's Hall Restaurant, on August 1st (Capping Day), at 7 p.m.; Dr. Cobbold, F.R.S., Professor in the Royal Veterinary College, in the chair. Amongst the visitors were Sir Bartle Frere, K.C.B., Dr. Vandyke Carter (Bombay), Professor Mariette (King's College), Dr. Forbes Watson, Mr. Brudenell Carter, Dr. Charles Cobbold, and Mr. Hortin. About thirty members sat down. The chairman, after the usual loyal toasts, in proposing "The Edinburgh University," said that at present she showed no signs of decay. As linking the present with the past illustrious roll of teachers, he might especially mention the names of Sir R. Christison, Dr. Balfour, and Dr. John Hughes Bennett. The University would maintain her intellectual position by selecting the foremost men in theology, law, art, and medicine. He concluded, says the *British Medical Journal*, "a most eloquent speech by urging warm sympathies in supporting the interests and welfare of the Edinburgh graduates. Sir Bartle Frere, in responding for the visitors, stated that his experience showed a growing reluctance on the part of Scotch graduates to accept public service abroad; and then, in graceful terms, proposed the health of the chairman." Drs. Glover, Halley, Cook, the Chairman, and Dr. Charles Cobbold, sang some old ballads with good effect. Dr. Ramsay (Torquay), Dr. Birdwood (India Office), and Mr. William Spowart Beveridge, were admitted as new members of this prosperous Club. Amongst the other guests invited, but whose engagements did not permit of their attending, were Professor Simonds, Principal of the Royal Veterinary College, John Gay, Esq., F.R.C.S., and Dr. John Rowe, of Mount Battery, near Melbourne, who is now on a visit to this country.

OBITUARY.

We regret to have to record the death, by accident, of Mr. Andrew Simpson, M.R.C.V.S., Kendall, Westmoreland, in the thirty-fifth year of his age. A fortnight before his death he sustained severe internal injuries from the horse he was riding, rearing and falling backwards upon him. At first it was hoped that his recovery was not improbable; but unfortunately this expectation was not realised. His death took place somewhat suddenly.

We have also to record the death of Mr. Isaac Seaman, M.R.C.V.S., Saffron Walden, in the fifty-first year of his age. Mr. Seaman was a member of the Edinburgh College, and obtained his diploma April 23rd, 1845. He was much and deservedly respected.

ERRATUM.

In the August number, page 631, line 4, *for* "Mr. John William Marsland," *read* "Mr. J. Wagstaff Marsland."

THE

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Communications and Cases.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from p.* 652.)

The collection of plants which will now occupy our attention is named after the genus Chenopodium, the *Chenopodal alliance*, in which are brought together a series of plants remarkable for their inconspicuous flowers. Some, indeed, have only a calyx, yet this organ is sometimes so coloured as to simulate the corolla.

Lindley has placed four natural orders under this head, of which we shall describe the following:

Amarantaceæ.—Amaranths. *Stamens opposite the sepals, ovary* 1, *often several seeded.*

Chenopodiaceæ — Chenopods. *Stamens opposite the sepals, ovary* 1, *always one-seeded.*

We will here describe the latter order first.

The Chenopods are described by Professor Balfour as follows:

Chenopodiaceæ (*Chenopods*, the goosefoot family), a natural order of *Monodichlamydeous dicotyledons*, characterising Lindley's *Chenopodal alliance.* Herbs or under-shrubs with alternate, sometimes opposite, leaves without stipules, and small flowers, which are sometimes unisexual, *i. e.* have stamens and pistils in separate flowers. Perianth (calyx) deeply divided, sometimes tubular at the base, persistent, stamens inserted into the base of the perianth and opposite

to its divisions. Ovary free, one-celled, with a single ovule attached to its base. Fruit an utricle inflated or an achene, sometimes succulent; embryo curved round, mealy albumen, or spirally curved without albumen. Inconspicuous plants, found in waste places, in all parts of the world, but abounding in extra-tropical regions. Many of them, as species of Salicorina and Salsola, inhabit salt marshes in the northern parts of Europe and Asia. Some of them are used as pot-herbs, for instance, spinach (*Spinacea oleracea*), orach (*Atriplex hortensis*), beet (*Beta vulgaris*), English mercury (*Chenopodium bonus Henricus*), Australian spinach (*Chenopodium erosum*). The mangold wurtzel is a variety of beet used for the food of cattle. The beet is much cultivated in France for its sugar. Some of the plants yield soda; others supply essential oils, which render them useful in cases of worms and in spasmodic diseases. The seeds of *Chenopodium quinoa* are used as food in Peru. They abound in starch, but have a bitterish taste. The seeds of *C. bonus Henricus* are used in the manufacture of shagreen. There are seventy-four known genera and 533 species."

Two genera of Chenopods especially claim our attention; they are Chenopodium and Beta.

The first genus contains several native species, many of which run into endless varieties. They occur everywhere, but more particularly tracking cultivation, establishing themselves on manure heaps and waste places, and becoming common weeds both to the farm and the garden.

Two species are found about the farm which deserve particular notice; they are the *Chenopodium bonus Henricus* (good King Henry), a name which has given rise to no little discussion, some supposing it to have reference to Henry VIII and his sore legs; but we suppose that few people recognise him as so superlatively good. We find the following note upon this subject in the 'New English Botany.' Withering tells us that a French writer says—"This humble plant, which grows on our plains without culture, will confer a more lasting duration on the memory of Henri Quatre than the statue of bronze placed on the Pont Neuf, though fenced with iron and guarded with soldiers."

Bentham, speaking of its habitats, says that it grows "on waste ground, near villages and sheepfolds, in the mountain districts of Europe and Russian Asia, except the extreme north; in Britain chiefly on roadsides near villages and dwellings; in England, Ireland, and southern Scotland; but in many places introduced only, having been formerly much cultivated as a pot-herb."

Much spread about the midland counties as this plant is, we are still of opinion that it has been introduced into this country, and doubtless on account of a continental reputation, not only as a pot-herb, but as a vulnery. In the former case it is boiled and eaten like spinach, of which, indeed, it is no bad kind. Like most leaves and the leaves of other innocuous plants, it has got a wide reputation for hurts and wounds.

Another form, the *C. album*, the white goosefoot, wild orache, bacon-weed, fat-hen, is far too common an agrarian weed. Its common names point to it as a plant indicating richness; and as it flourishes so enormously in highly manured soil, it is supposed to be produced by dung, and, indeed, there is reason to believe that when a single plant growing on the dung-heap will in a few weeks ripen as many as 40,000 seeds, enough may be scattered in the manure, not only to crop the ground, but to smother out the legitimate crops.

Again, some smaller plants may produce seeds in the corn crop, and when this is ploughed and manured for roots, even though the latter be artificial manures, the ground will be cropped with the weed which has got the names of fat-hen, bacon-weed, mutton-dock, and the like, from the rampant manner in which it grows in good ground.

The young shoots of this plant furnish a very wholesome and nutritious vegetable of the spinach kind, and, treated like it, we have found it highly palatable, *e. g.* the fresh leaves and young shoots, when washed, will boil in their own juice; then squeeze and pulp, add a little butter, pepper, and salt, and a *soupçon* of lemon juice and vinegar, and garnish with poached eggs, and a "dainty dish" will be the result "to set before a queen."

Of course, the way to prevent any mischief from the weed will be to keep it from seeding, to which end early hoeing or pulling will be necessary, as it is needless here to say that the dictum of the farm labourer, that "it is nat'ral to the sile," or "to the crop," if by this they mean—and they do so—that it comes up regardless of seed, or that the land generates it, of course the error will be too palpable to require refutation in this place.

The *Beta maritima* is an interesting sea-side plant which is supposed to be the parent of beetroots, of which there are many varieties; among these the white Silesian sugar-beet, grown for its sugar, and the mangold wurtzels of the farm, no less remarkable for their variations, giving rise to recognised sorts, which are more or less favourites with the farmer.

As regards beets, they are grown more for the table in America than in England, where several sorts are used in the young state, like small carrots, as a vegetable.

With ourselves two sorts of beet seem to find favour with the gardener, one producing a fine deep-red root, which, baked or boiled whole, and afterwards peeled, and then cut in slices and treated with vinegar, salt, and pepper, makes an excellent pickle, salad, or addendum to fish, especially cod.

These roots should be pulled as gently as may be, to prevent breaking the roots, as this lets out the colour; so in cooking they should only be washed, and not broken more than may be, for the same reason.

Other sorts are grown for their leaves, and called poirées by the French. Some of these are used by cooking the pagina of the leaf, in the same manner as spinach, whilst others have the petiole and mid-rib cooked and served like asparagus.

These latter are highly interesting in a physiological point of view, for inasmuch as they are not cultivated for their roots, these are forked in an extraordinary manner, whereas the sorts grown for the roots are as free from forkiness and as fleshy as possible.

The mangold wurtzel is now much grown as an agricultural crop, as its yield is sometimes uncommonly large. It is a good vehicle for filling up with stronger food in the fattening of cattle, and as it comes into use after swedes and turnips are done, it is very valuable, both for milch, store, or fattening beasts.

It would seem, however, that the climate of England is not everywhere suitable for this crop, as late and early frosts and cold winds preclude the possibility of sufficient time to bring the crop to perfection.

In the south of England mangolds grow well even under such conditions of drought as may render it difficult to grow swedes; hence, this year, mangolds, though not a large crop, have been tolerably certain, while a dry spring, the action of the fly, destroyed many a patch of swedes.

As a rule, the fly does not attack the mangold in this country, though we have had sent to us beetles that are said to be particularly active with it on the Continent.

The leaves and young roots of mangolds contain a large quantity of purgative salts; hence, Messrs. Way and Ogston give the following as the mean of three analyses of roots or bulbs, and of the leaves of red and yellow mangolds respectively. One ton of bulb and one ton of leaf removes the fol-

lowing quantities of mineral matters from the soil, from which it will be seen that the leaves take away a much larger quantity of mineral matters than the bulbs, and hence the advisability of leaves on the soil when mangolds are pulled.

	Mean of Three Specimens of Bulbs.	Mean of Three Specimens of Leaf.
Potash	4·99	7·86
Soda	3·02	2·52
Lime	0·41	3·31
Magnesia	0·43	3·27
Oxide of Iron	0·12	0·52
Phosphoric Acid	0·66	1·94
Sulphuric Acid	0·65	2·20
Chloride of Sodium	5·29	12·82
Silica	0·54	0·76
Total*	16·11	35·20

It is on account of this constitution of mangolds that we often find them so valuable in the treatment of animals; hence, for all kinds of stock, if suffering from constipation, we pull a few of the bolted plants of mangolds, as they are of no use for their roots, and will consist, for the most part, of just the organs to produce the greatest amount of salts.

ON FIRING.

By W. A. Cox, M.R.C.V.S., "Veterinary Staff," Dublin.

I HAVE read with pleasure the observations of Mr. Hill on the "Actual Cautery," published in your Journal, and venture to supplement them by the following remarks.

I think, as a profession, we cannot be stigmatised as purposelessly cruel or brutal, and although this operation is considered by the uninitiated as a barbarous one, it is often proved to be the reverse. Experience tells us that for a short period of acute pain we rarely fail to give permanent relief, and thus attain a desirable object, and one that justifies the adoption of the actual cautery. It is the refinement of an idea—in fact, "hair-splitting"—to cavil at it. If we destroyed these animals rather than thus operate upon them to render them sound for the purposes of work, we should sacrifice a great percentage of horse-flesh.

This operation is most common upon the lower parts of the extremities, for sprains, for spavin, and various osseous deposits, and for distensions of the bursæ. Formerly the

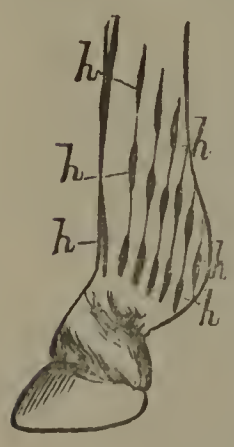
* This shows more than double in the leaves than in the roots.

hip or the shoulder were fired for lameness, the operation being performed in a circular manner or moon-shaped, but the custom has become almost obsolete.

The action of firing is twofold—first, as a persistent compress or bandage, and that this is the case may be easily demonstrated. If the actual cautery is used to any part of the frame there is destruction of tissue; nature, however provident, never entirely restores it, and the new growth is not of the original character. This may be felt in the cicatrix of an extensive "burn" on our own person. Secondly, it acts as a counter-irritant; but this action, compared with the first, is temporary, and I think, in the majority of cases, that the most benefit accrues from the compression.

Methods of firing.— These are two—deep and superficial. The method will depend on the object of the operation, the duration of lameness, and the size and character of the enlargement. If it is of long standing and the animal is very lame, and the operation determined on, *fire deeply*. Firing has often proved useless because the operator has been afraid to blemish, and has simply used the iron *superficially*, making a "nice job" to the eye, but useless. A sound animal with a blemish or "eye-sore" is better than a lame one without a blemish.

To fire *deeply*, with as *little blemish as possible*, is a desideratum. The fashion of firing varies, and some of our clients wish it done one way, some another, while many are content to let it rest in the hands of the proper person—to wit, the operator. There is the feather system, the inverted, the circular (where the lines pass in circles from side to side), the longitudinal, &c. One and all have their advocates and their various advantages, depending upon the part to be operated upon; but it matters not about the fashion so long as it is *deep enough to penetrate the skin*, for to be truly effectual this must be accomplished, and I think I shall prove that this may be done without the extensive wounds and large sloughs that often follow.



You may take any method you fancy, but for example we will select the longitudinal. The iron is passed from above downwards, but instead of allowing it to go through the skin the entire length, or for any coniderable distance, let there be intervals, where it is used only lightly, of half an inch, the divided portion being of equal length; these should not be in a line with each other, but slighly spiral, after the manner of a bandage. The sketch will

more fully explain my meaning; *h* to *h* shows the heavy lines perforating the skin; the light lines are the continuation or connection lines of the firing.

The iron should be blunt, rather than sharp on its edge, and of a dull-red heat; if too hot it destroys a great portion of the surrounding tissue, and we have an ugly wound following.

Experience in this method proves its decided advantage, both in the removal of lameness and the comparatively slight traces left of the operation.

In *all* operations it is desirable to inflict as little punishment as possible upon the patient. To accomplish this we should operate expeditiously. The irons, if very hot, would char and probably not punish so severely at the time, but the after-punishment would be much greater from the sloughing which would take place. They should be of volume sufficient to retain heat for some time, as their entire removal, or rather the cessation of the operation and its recommencement, renews the shock.

After the operation douching or sponging with cold water will have a beneficial effect. The system of blistering *immediately* has not practically recommended itself to me.

REMARKS ON "SEEDY-FOOT."

By J. J. Meyrick, M.R.C.V.S., Calcutta.

While in veterinary charge of one of the Government studs, now abolished, I found a large number of animals affected with "seedy-foot," under circumstances which seemed to scarcely accord with some of the ordinary theories of the causes of the disease.

I have had as many as twenty cases at a time under treatment, among colts and horses of all ages, from nine months to four years old. They were, almost without exception, well-bred animals, and none of them had ever been shod or worked.

The hoofs affected appeared to have been naturally as strong and good as the sound ones, and the disease was as common in the hind feet as the fore.

It could be seen in every stage, from cases in which the decay had only just begun on the ground surface of the wall to those in which it had formed cavities extending nearly up to the coronet.

"Seedy-foot" is scarcely ever known in the other Bengal studs, and the one in question differed from all the rest in being located on a moist instead of a dry and very fertile soil, containing a large quantity of dark vegetable mould, upon the surface of which nitrate of potash constantly effloresced.

May not the disease be produced by moisture fostering the growth of a minute kind of fungus which lives upon horn, just as dry rot is caused by a fungus living upon wood? Perhaps a skilful microscopist might decide the question.

I found the following treatment almost invariably successful:

Remove enough of the outer wall of the hollow part to prevent its lower edge pressing on the ground when the horse is galloping. Clear away all the crumbling horn with a searching knife, and fill the cavity every day with tow soaked in a mixture of one part of carbolic acid to three of oil. The decay stops at once, and the cure is effected as soon as the sound horn has time to grow down. The disease will, however, often recommence if the daily application of the dressing be neglected before the hollow part has been entirely eradicated.

My reason for first trying carbolic acid was that it possesses the power of preventing decomposition and destroying minute animal and vegetable organisms. Possibly other substances with similar properties might be equally effective in seedy foot.

TREATMENT OF YOUNG HORSES' FEET.

By the Same.

Having had, for more than two years, several hundred colts and fillies constantly under observation, I was often surprised at the extraordinary improvement produced in badly shaped feet by proper management.

Many of the young animals, when first bought for the stud, at from six to twelve months old, had feet quite deformed through the neglect of the native breeders. The toes were frequently several inches too long, and the weight in consequence was thrown chiefly upon the heels, producing low and weak heels, flat feet, and a far too great obliquity of the pasterns.

With careful treatment, such as gradually shortening the toes, leaving the heels untouched, &c., the feet in time grew

into natural shape, and the pasterns acquired their proper slope.

In other cases, where the feet were almost perpendicular, through the toes having worn away and the heels grown deep and strong, the desired end was attained by gradually lowering the heels.

The changes produced in young animals by such simple means are so great that I believe badly shaped feet would scarcely ever be seen in well-bred horses if they were not mismanaged or neglected while growing.

The external form of the hoof influences, by pressure, the internal parts, including even the bones; but as the latter become consolidated with age there is more and more difficulty in modifying their shape, and, so far as I have seen, but little improvement can be effected after a horse is two or three years old.

PARTURIENT APOPLEXY IN THE MARE.

By John Gerrard, M.R.C.V.S., Market Deeping.

Principal Walley, in his comments on my communication on the above affection, published in your last number, endeavours to get out of the difficulty he is placed in, not by trying to explain or reconcile the views of Monro and Reid on the circulation of the brain with the theory he advanced to account for the occurrence of *true* parturient apoplexy in the cow, which I stated were at variance, but by firing off at me a number of questions, evidently stirred up in his mind by the opinions of the late Professor Barlow, and having no special bearing on the subject in dispute—somewhat in the way that a Scotchman is said to answer a question by asking another.

Whether *I* have "injected and dissected the heads of many or few cattle," or whether *I* have found any exceptions to the distribution of the vessels as described by him, has nothing at all to do with the question at issue.

I advanced no theory nor made any statements but what were borne out by facts; and simply in the interest of science and (I trust) in a friendly spirit tried to point out the incompatibilities in the one adopted, and the other advanced by him.

If they had only existed in *my* stupid imagination he might have easily tried to prove it so for the benefit of

science and the good of his less fortunate and less gifted fellows. Had Mr. Walley addressed himself to the reconciliation of the conflicting theories touched upon by me, instead of the peccadilloes of my communication, I probably should not have had to trespass on your space or your readers' patience on this subject. But as he accuses me of vagueness, inconsistency, and less plainly of other offences, I claim space for a few remarks in reply.

My object in the communication referred to being to show—*first*, that the mare is not exempt from parturient apoplexy; *secondly*, that it was not of the same nature as in the cow; and *thirdly*, that as I thought the pathology of the disease in her was rather misty—an example of which I adduced—I might be able to clear up the haze that hung around it by reproducing the thoughts of Professor Barlow as the best I knew on the subject, and as, in all likelihood, not generally known, and thus try to throw some light, or induce some reflection, on the disease and its treatment.

Apart, however, from any other consideration, the subject itself is worthy of impartial discussion in your columns, for we are not by any means, as a body, agreed as to its nature, prevention, or treatment; and however much we may theorise and speculate on its nature, we have to confess our utter inability at times to cure it.

But if "parturient apoplectic attacks in the cow are determined principally by the arrangement of the cerebral blood-vessels," as Professor Walley maintains, it is clear and evident we are powerless to avert or cure it at any time; and more especially if we adopt the Monro and Reid theory, on which the Professor bases his reasoning on the subject, a theory which maintains that "the amount of fluids within the cranium must always be the same so long as its osseous walls are capable of resisting the pressure of the atmosphere." For if we try to lessen the flow of blood to the brain by bleeding, even to syncope, and thus try to prevent it, as we should do according to Principal Walley's theory, Monro and Reid step in and say the plenitude of the cranium must be maintained.

Professor Walley complains that I fail to call attention to the many *collateral circumstances* which he mentions; but what can any circumstances avail, provided that the cow carries about with her the elements of her own destruction in the shape of anatomical peculiarities of her cerebral blood-vessels, which he maintains "is sufficient to explain why the cow is liable to true parturient apoplexy to so great an extent, and the reason why the mare is comparatively exempt from it"?

But, perhaps, he may say that the anatomical peculiarity is only capable of inducing it when taken in connection with the *collateral circumstances* he refers to. True, but he has yet to show what part these *collateral circumstances* play in inducing the disease, in connection with his theory, which he maintains is of itself sufficient to account for the disease in the cow, and thus puts all other circumstances clearly out of court.

If his theory be true, why is it we do not have apoplectic attacks oftener in the ox tribe? The straining in cases of pelvic hæmatocele is sometimes excessive, and in cases of prolapsus uteri no less so; but after none of these cases have I ever heard, seen, or read of it occurring. Nor does the disease occur after severe and protracted cases of parturition, nor in young heifers, which very often have strong pains, as it should do if it be a determination of blood to the brain, induced by a peculiarity in the supply thereto.

Moreover, if this be the true and only explanation of the disease, we should surely find some more tangible and ocular evidences in the shape of congestion and effusion into the organ after death.

These, I beg to maintain, are seldom if ever present in cases of true parturient apoplexy, or what we consider as such in the cow; at least, I have failed to detect them, and unfortunately I have seen too many, and have always been disappointed in finding such proof as would warrant the conclusion that it depended upon what Professor Walley says it does.

Even the Professor himself, in his essay to which he refers me, is obliged to admit this difficulty, for he says, "We frequently hear the remark that no satisfactory *post-mortem* changes are found in animals that have died from parturient apoplexy. This is to a great extent true, although, in not a few instances, it results from want of opportunity or time on the part of the veterinary surgeon to institute a sufficiently searching investigation into the *post-mortem* lesions. The surgeon, who has greater facilities in hospitals to make such examinations, has often to search, in cases of apoplexy, a long time before he can find any satisfactory changes, and occasionally fails altogether in doing so, and under the circumstances it is not to be wondered at that, in so far as the *post-mortem* examinations of cattle are concerned, the results should in many instances be *nil*."

If it depended upon the "increased supply" and "easier method" of ingress of blood to the brain of the cow, surely we should not experience such difficulties in detecting it as

Mr. Walley himself admits. Surely all the veterinary surgeons would not be so pressed for time and opportunity as to prevent them making such an examination as to put the matter beyond dispute, provided that it depended on a cause which should make *post-mortem* appearances so palpable.

The case of the mare I reported was a *true* case of apoplexy, and the *post-mortem* appearances were umistakable, and so they would be in the cow if the disease were of the same nature, and the cause what Professor Walley says it is.

I am very far, however, from denying its nervous nature or origin; or that in very acute and exceptional cases congestion, effusion, and even clots may be found occasionally in the brain; but I maintain that they are the exception, and not the rule, and not a constant condition of the organ or palpable to the unaided eye, as they should be if the disease were caused by the anatomical arrangement of the blood-vessels.

Besides these positive and practical objections to the theory, there are others less practical but more positive.

And, first, the symptoms in the cow do not favour the theory of compression of the cerebral mass, for coma is never present at the commencement of the disease, as it would be if effusion took place, and as pressure on the brain is the keystone of the Professor's theory he is bound to explain this anomaly.

Secondly, the physical impossibility of putting more matter into an air-tight cavity that is already full, and cannot be emptied unless by admitting the atmosphere, so long as the vital processes are in the ascendency. True, the circulation or the passage of blood through the vessels may be quickened; but unless rupture of some of them occur it is difficult to see how the stasis takes place, when it is regulated by physical law which can only be altered by miracle. It would be interesting to know whether it be the *vis à tergo* or the *vis à fronte* that is the first to give way in the production of the stasis in this mechanical theory.

And, lastly, the evidences of wisdom and design manifested in all the Creator's works give a direct negative to the theory.

These are nowhere more apparent than in the construction of the cranial cavity, and the supply and distribution of blood to the organ contained in it. The careful protection from accidental disturbance and variations from external circumstances afforded by the number and tortuosity of the large arteries and their numerous anastomoses, whereby the

uniformity of supply of blood is insured to such an important organ as the brain, is one of the many proofs that Infinite Wisdom has fashioned it for the pleasure and preservation of the being in which it is found.

If the ox has a more complicated arrangement of blood-vessels in the cranium than the horse, we may rest assured it subserves a wise and useful purpose. If we inquire into any peculiarities of formation in living creatures, we find that they are adapted to some instinct of the creature, or accommodates it the better to the circumstances in which the Creator has placed it.

Instead of seeing a cause of extirpation and death in the arrangement of the cerebral blood-vessels of the ox tribe, as does Mr. Walley, I see an admirable contrivance for the prevention of disease and the preservation of the species. Nor is the ox the only domestic animal in which it is present, for it prevails in all the Ruminantia who have to use their heads and horns for the purposes of attack and defence, and such in all probability is one of the objects of the arrangement.

Has Professor Walley never observed the peculiar arrangement of the intra-cranial part of the internal carotid of the sheep, known as the *rete mirabile* of Galen? It is a much more complicated arrangement than that in the ox, but we do not find parturient apoplexy in the ewe, and the "*heaving pains*" in her are at times most excessive.

It is present also in the goat, whose climbing powers and butting propensities would render it extremely liable to destruction did it not possess some such arrangement to equalise the flow of blood to the organ in which consciousness resides. Time and space, however, forbid me pursuing this point further; but I trust I have said enough to make my objections to the theory sufficiently obvious to your readers, and that it requires some better explanation and demonstration than we are yet in possession of before it can be accepted as the cause of *true* parturient apoplexy in the cow.

Regarding the opinions of the late Professor Barlow, which Mr. Walley "*has never before seen,*" but "*which marvellously support his theory*" and contradict mine, I can only say that I fail to perceive one jot or tittle in them that gives the least hint that the disease in any way depends upon the arrangement of the cerebral blood-vessels. And what Professor Walley quotes as my theory, that is contradicted by the opinions of Mr. Barlow, is not a theory at all, but facts, the result of *post-mortem* observations, and which I still adhere to, and

maintain that we can have congestion of nerve-centres, and even disorganization of nerve-tissue, sufficient to cause apoplectic symptoms without being able to detect it by the unaided eye.

Professor Walley's reasoning on this point—indeed, his whole communication—forcibly reminds me of the course pursued by one of the family of the cephalopodous mollusca, *Loligo vulgare*, which when approached by any human form ejects the contents of its ink-bag, and tries to escape under the cloud of its own erection.

"*Finally*," says Mr. Walley, "I fail to detect what *unscientific practices* Mr. Gerrard has attempted to expose or prevent the repetition of." To this I can only say that I am sorry for such obtusity of intellect, and regret exceedingly that I had not made them more apparent. To do so now, for his gratification, would be to endeavour to perpetrate an insult on the intelligence of your readers, of which I have no wish to be guilty.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of August, 1874, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign Ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Calais	London	Foot-and-Mouth	170	...	...	...	170	170
Total			170	...	...	...	170	170

"ALEXANDER WILLIAMS, *Secretary*.

"Privy Council Office,
"Veterinary Department, 14th September, 1874."

CATTLE PLAGUE.

This disease, which was introduced into Italy and found to exist in the neighbourhood of Brindisi on the 15th of August, has not yet been stamped out; in fact, the authorities do not appear to be applying such energetic measures as are required, for we hear of some animals remaining alive which are "recovering" from the disease, and others as being "suspected" of having it. Between the 15th of August and the 5th of September seven farms were declared to be infected, on which 271 head of cattle were located. Of these, 181 had been attacked with the disease, and 89 are said to have died. Twenty-nine are reported to be recovering, while 50 are classed as suspected. Of the 89 sacrificed to the disease, 25 only were slaughtered by order of the Local Authorities.

Information received from Gumbinnen states that cattle plague had broken out in a virulent form in the Province of Suwalki, in Russian Poland, within about ten miles of the Prussian frontier, and that importations into Prussia were stopped. A thousand animals are said to have been destroyed up to the date of the last report.

Cattle plague has also appeared in some districts in the Don Cossacks' territory in Southern Russia. The disease is also stated to prevail in six other localities in Poland.

From Jerusalem we learn that the disease has so reduced the number of animals in the country around the city that it now finds few subjects to attack.

Cattle plague still continues in the island of Naxos, and in Croatia, Slavonia, and the border frontiers.

Hungary is reported to be free.

PLEURO-PNEUMONIA.

This disease has appeared in the department of Vaude, in Switzerland, and the Government, with the view of stamping it out, have caused two large herds of cattle to be slaughtered, compensation to the amount of the full value of the animals being given to the owners.

The Globe, alluding to this circumstance, says that "the Vaudois authorities are taking into serious consideration the outbreak of cattle disease in the Bégnines mountain, which threatened to have alarming consequences. A committee has been named by the Conseil d'Etat for the purpose of taking

measures to prevent the spread of the disease. On one farm 103 beasts were condemned and slaughtered, and on another 180. The carcases in each case were thrown into a deep crevasse in presence of the magistrates. It is feared that many more animals will have to be destroyed."

In this country pleuro-pneumonia is widely spread, about forty-five counties being returned as infected. Some of the outbreaks being among large herds of cattle, the losses have been proportionately great.

SHEEP-POX AND OTHER CONTAGIOUS DISEASES.

THE existence of sheep-pox, glanders, splenic apoplexy, and pleuro-pneumonia, is reported from Pomerania.

From New Orleans, U.S., a virulent form of blood disease (*cherbon*) is reported to be prevalent among horses, mules, horned cattle, and swine, and to have proved very fatal.

Facts and Observations.

SMALLPOX INOCULATIONS.—*The British Medical Journal* of Sept. 5 says that "The attention of the Guardians of the Castlebar Union has been lately directed to the important fact that inoculation with smallpox virus prevails to a great extent in the various districts of that union. Drs. Blackall and Walshe report that smallpox of a most virulent type exists there at present as a result of this method of treatment, and that it is extending considerably. The Guardians have very properly decided to prosecute in every specified case, and it is to be hoped that summary punishment will be meted out to the delinquents of this most dangerous practice. It is reported that an irregular practitioner has inoculated a number of persons, some of whom have since died; and that, at an inquest which was held on a child who had so died, the jury returned a verdict of 'Wilful murder against some person or persons unknown.'"

CHLORAL HYDRATE AND CAMPHOR. By T. F. BROWN. ('Pharm. J. Trans.' [3], iv, 729).—If chloral hydrate and camphor be rubbed together in a mortar, a rise of temperature is observed, and a syrup is obtained, which is neutral to test-papers, and does not give a precipitate with silver nitrate. On treatment with distilled water, it hardens to a white translucent solid; the chloral hydrate after some time appears to be dissolved out, leaving the camphor in crystalline grains.

It is of great value as a local application in cases of neuralgia and toothache.—*Journal of Chemical Society.*

Action of Atmospheric Nitrogen in Vegetation. By P. P. Behérain (*Compt. rend.*, lxxvi, 1390—1394).—The author has shown ('Journal of the Chemical Society,' 1872, 164), that a mixture of glucose and an alkali heated in air absorbs not only oxygen but also nitrogen. Glucose and solutionof ammonia, heated with a confined portion of air in a water-bath, absorbed the whole (9·5 c.c.) of the oxygen, and 17 c.c. of nitrogen; if the absorption had been due to the formation of nitric acid, much less nitrogen would have been removed. No cyanides were produced. When a current of air was passed through a slightly warmed solution of 10 grams of glucose and 40 grams of caustic soda, ·015 gram of nitrogen was absorbed; whennitrogen gas was substituted for air, ·069 gram was absorbed. In these latter experiments the nitrogen was determined by combustion after evaporation, and clearly, therefore, did notexist as ammonia. In experiments made at the ordinary temperature in a eudiometer, negative results were generally obtained when atmospheric air was employed, except in cases in which all the oxygen was taken up; but when nitrogen gas was employed, absorption generally took place, the mixture of glucose and soda being most active; small absorptions of nitrogen were also obtained from moist sawdust, with or without slaked lime.

A Productive Source of Ammoniacal Salts. By B. Terne (*Dingl. Polyt. J.*, ccviii, 386).—In the neighbourhood of Chicago are the immense slaughter-houses of the American north-west. In the slaughtering season, from November to January, as many as 25,000 to 30,000 cattle are slaughtered in a single day. This number extends over about twenty establishments. A large quantity of refuse and useless flesh remains on hand, and is placed in a large iron boiler and boiled under a pressure of three to four atmospheres. The fat rises to the top, and beneath it is a liquid which might be called a solution of glue, if the continued boiling under pressure had not completely destroyed its binding power.

These tank-waters were found to contain from 105 to 118 grams per litre of gluey extractive matter. This, as already observed, is useless as glue; but the author also found that the liquid contains ammonia equal to from 5 to 8½ grams per litre of ammonium chloride.

THE VETERINARIAN, OCTOBER 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

THE CONTAGIOUS NATURE OF PLEURO-PNEUMONIA.

RECENT investigations have thrown much light on the contagiousness of pleuro-pneumonia, and the means by which the disease extends the area of its existence. Like some other diseases affecting cattle which are known to be infectious, pleuro-pneumonia has been supposed to be easily communicated by diseased to healthy animals, through various means other than that of actual cohabitation.

It will be admitted that a correct solution of a question of this kind is of considerable importance to the best interests of the country, and that it must greatly assist local authorities in deciding what is best to be done to stay the progress of the disease.

It has long been known that we have been dissentients to the views entertained by many veterinary surgeons, that pleuro-pneumonia—like cattle plague, for example—can be freely communicated by *fomes*. The failure of the so-called pleuro-pneumonia inoculations, so extensively practised for upwards of twenty years, in Europe and elsewhere, to produce the disease in the animals operated upon, shook our belief originally in the facile contagiousness of the disease. As far back as 1853 we dwelt on this in our report to the Royal Agricultural Society on the inoculation of cattle, and the experience since gained has only tended to confirm the opinion then enunciated.

The revival of the question consequent on the adoption of legislative measures for stamping out pleuro-pneumonia led us, in 1870, to have recourse to some further experiments with a view to its solution. The details of these were communicated at the time to the Royal Agricultural Society, and published in their journal, vol. vii, S. S., part 2.

"The first experiment consisted in exposing a steer to the inhalation of the vapour of some diseased lungs. For this purpose a dairyman's cow, suffering from pleuro-pneumonia in its advanced stage, was killed, and the lungs immediately removed from the chest and placed with the experimental animal in a closed loose-box, care being taken so to secure the head of the steer that at each inspiration the vapour should enter the respiratory organs. The steer was kept in this position until the lungs had become cold; but even then they were not removed from the box, it being determined to leave them with the animal until visible decomposition had begun. The animal was carefully watched day by day until the expiration of the tenth week, but not the least deviation from health was observed during any part of the time."

"Subsequently it was determined to repeat the experiment in a modified form, and for this purpose a sponge was placed in the nostril of a diseased cow, and allowed to remain until it had become thoroughly saturated with the breath and also with the mucus discharged from the nostril. It was then transferred to the nostril of an experimental animal, and retained there for upwards of half an hour. As in the former case, the animal was closely watched for several weeks; but again no ill effects followed. Besides these two experiments, some mucus obtained from the respiratory organs of diseased cattle was rubbed, on several occasions, upon the mucous membrane of the nostrils of other experimental animals, with a view to effect its absorption. These experiments had also a negative result."

Some additional experiments have since been instituted. It was first determined to ascertain whether any portion of the serous exudation from a diseased lung could safely be injected into the lungs of an animal. For this purpose two sheep were selected, and a drachm of exudation fluid injected into the left lung of each by puncturing the upper part of the chest with a small tubular stylet fitted to a syringe. The animals presently began to feed with quite a natural appetite, and did not apparently suffer any pain. They were kept under close observation, and their temperature registered day

by day, but no indications of disturbed health were detected. Weeks passed away, and during the whole time they remained perfectly healthy.

On April 10th of the present year *two drachms of serous exudation* from the lung of a cow, the subject of pleuro-pneumonia, were injected into the left lung of an eight months' old heifer calf. At the same time a like quantity was injected into the left jugular vein of another calf of the same age; and to a third calf, *seventeen days old, half an ounce of the same fluid mixed with two ounces of milk was given as a draught.*

As no ill effects had been recognised in either animal by April 12th, an ounce of the same serous exudation was given to the *young calf*, mixed with milk as before. A microscopic examination of the fluid showed the presence of Bacteridies in large numbers.

On the 15th the young calf gave evidence of *blood-poisoniny*, and on the evening of the 16th it died.

No lesions, other than those common to blood-poisoning, were met with on a *post-mortem* examination, in any organ of the body.

The heifer calves, like the sheep, entirely escaped any pulmonic attacks; indeed, with the exception of a small slough being detached from the site of the puncture into the jugular vein, they have continued well down to this time—a period of upwards of five months.

In the month of June last two other experiments of a similar kind were had recourse to, the subjects being a young steer and heifer, both about ten months old.

Six drachms of exudation fluid from a diseased lung were injected into the lung of one animal, and the same quantity into the windpipe of the other.

Both these animals gave indications of local disease in little more than a fortnight afterwards, and in another fortnight one died and the other was killed. *In both cases, however, the lungs were found perfectly free from those lesions which specially belong to pleuro-pneumonia.*

It is thus conclusively proved that pleuro-pneumonia does

not extend the area of its existence by any of the ordinary means which cause the spread of infectious diseases.

Full details of these experiments will appear in next number of the 'Journal of the Royal Agricultural Society,' to which we refer our readers.

THE GROUSE DISEASE.

The following article appeared in the *Times* of September 5th. It has such an important bearing on what may be called the veterinary aspects of sanitary science that we do not hesitate to reproduce it almost *in extenso*. It will be observed that the writer makes reference to the Welsh epidemic affecting ponies, public attention to which was first drawn by contributions to our pages:—

"The fatal murrain among grouse, which ever since 1866 has prevailed more or less extensively in this country, and which this year has almost entirely swept away the birds over extensive districts, is a subject of such importance to many landowners, sportsmen, and consumers, and incidentally involves such large pecuniary and other interests, that the apathy with which its ravages have been regarded is scarcely creditable to those who should be most concerned in preventing them. While the birds have been perishing by thousands, the only sign of activity manifested by the proprietors has been a perennial deluge of letters in the sporting papers, letters in which 'A. B.' and 'Y. Z.' have announced that the disease was due to east wind, or to excessive drought, or to too much moisture, or to over-feeding, or to under-feeding, or to arbutus berries, or to dew, or to the practice of 'driving,' or to one of a hundred similar guesses, put forth with all the characteristic dogmatism of people who mistake the absence of knowledge for an opinion. From the appearance of the epidemic to the present time there has been no practical recognition of the obvious truths that the grouse disease, like other diseases, presents problems which require for their solution a close observation of the facts, and careful reasoning upon them when observed; and that these requirements can only be fulfilled by men familiar with events of an analogous kind, and trained in habits of scientific research. Something has, indeed, been done in this direction, but the

inquirers concerned have received no encouragement to pursue their investigations. In order to enable them to do so it was once gravely suggested that a pecuniary grant should be made by the British Association; but the idea of the Association paying for the preservation of the property of great landowners, who were unwilling to preserve it themselves, seemed to involve an element of absurdity that stood in the way of its practical realisation.

"In 1867, however, the matter was before the Association in a certain way. It had been suggested that the epidemic was due to internal parasites; and Dr. Cobbold, the chief authority in this country upon such a question, read a paper at the Dundee meeting in which he pointed out that no evidence to such an effect had been obtained. He based his remarks upon *post-mortem* examinations which had been conducted by other persons; and said that the mere fact that in several, or even in many instances, tapeworms had been found in the intestines appeared to him insufficient to afford positive proof of injury from this source. It was only in a certain proportion of the grouse that the tapeworms were detected, and they were not present in numbers exceeding what might be looked upon as their average frequency in healthy birds. But in November, 1872, Dr. Cobbold received a batch of grouse from Nairn, and discovered in their intestines not merely a few tapeworms, but also countless numbers of a parasite new to science—a previously undescribed threadworm of extreme minuteness, to which he gave the name of *Strongylus pergracilis*. He then saw cause to change his opinion, and to think that the strongyli were the primary, and the tapeworms probably accessory, causes of the emaciation and death of the birds. In order to understand the probable nature of the influence which these parasites would exert, it is necessary to glance briefly at the conditions of parasitic life in general.

"In former times, when the known varieties of internal parasites were few in number, and when attention was generally called to them only by symptoms of illness, they were looked upon not only as causes of disease, but also as evidences of pre-existing weakness in the person or creature invaded by them. This view has survived the state of knowledge in which it had its origin, and still largely influences the thoughts and language both of medical men and of the public, although recent researches have clearly shown that it must be abandoned as untenable. Leuckart, Küchenmeister, Dr. Cobbold himself, and a number of fellow-workers in the same field, have shown that the human body, and the

bodies of birds, fish, and animals, are the natural homes of a great variety of organisms—mostly peculiar to the species in which they are found—and that the absence of such organisms should be looked upon as the result of accident or precaution, rather than their presence as a result of disease. Nearly every known creature has internal parasites of a kind found only in itself, or in itself and a few of its congeners; and Dr. Cobbold tells us that, in order to obtain an adequate conception of the relations which subsist between parasites and their hosts, we must look upon each bearer as a territory or area in which certain parasites legitimately take up their abode. The bearer is assigned to them for the purpose of their existence, and, in scientific phrase, they constitute the Fauna of the territory. The human territory is occupied by internal parasitic inhabitants, which might, if they could speak, claim as much right to occupy it as Englishmen have to occupy English territory. The internal parasites are divided into four totally distinct classes of parasites, differing in origin, in structure, and in mode of development, and having only the one character in common hy reason of which they are collectively termed *Entozoa*, that they all live inside their bearers. It need hardly be said that between them and genuine "worms" there is scarcely a single point of resemblance.

"The entozoa obtain access to the bodies of their bearers by being swallowed in food or drink; and several of them have to inhabit two or more organisms before they complete their metamorphoses and arrive at a state of complete development and reproductive maturity. When this is reached they are amazingly prolific. Each mature joint of the *Tænia mediocanellata*, the most common form of human tapeworm, will contain at least 30,000 eggs, and such joints will be matured and cast off at the rate of about 400 a month, during a lifetime of uncertain duration. The *Trichina* of the human subject may amount in a single patient to many millions; and Dr. Cobbold's grouse strongle, to which mainly he attributes the mortality, is found in one bird by tens of thousands. A moderate population of entozoa scarcely at all affects the health of a vigorous bearer, but all the entozoa may become sources of disease and death in various ways. Sometimes they prove fatal by the irritation produced by their presence or migrations; sometimes by actual interference with the functions of vital organs, as when they invade the hearts of dogs or the brains of sheep; sometimes they exhaust their 'territory' by sheer force of numbers, and present a new phase of the struggle for existence. They consume the vital

resources of their bearer, as locusts might consume the resources of a country.

"The entozoa found in grouse are of two kinds—the grouse tapeworm, or *Tænia calva*, discovered by the late Dr. Baird, of the British Museum, and the grouse strongle, or *Strongylus pergracilis*, discovered, as already stated, by Dr. Cobbold. The tænia ranges from four to ten inches in length, and is distinguished from allied tæniæ, such as that of the partridge, by minute differences which it is unnecessary to describe. The strongle is like a fragment of fine white thread, the males measuring from one third to three eighths of an inch in length, the females from three eighths to half an inch. They were found in all the birds which Dr. Cobbold examined, whether healthy or diseased; but in the healthy birds they were only "abundant," while in the diseased birds they were "very numerous"—expressions which Dr. Cobbold explains as intended to convey the difference between "thousands" and "tens of thousands." The presence of tapeworms, in the same birds, was only occasional; but Dr. Cobbold thinks it quite possible that, in some seasons, tapeworms may acquire ascendancy, and may become the sole cause of the mortality. Viewed generally, he regards the destruction of the grouse as being in no way due to disease *properly so called*, but simply to the exhaustion consequent upon the invasion of the "territory" by a greater number of entozoa than it can support without destruction. A similar mortality, due in each case to myriads of a special parasite, has occurred among ponies in South Wales and among pigeons at Woburn.

"Both the tænia and the strongle, as found in grouse, are in a state of full reproductive maturity, and must have passed through other phases of existence before being swallowed by the birds. In order to arrest the malady, or, at least, *in order to know whether it can be arrested*, it is first of all necessary to trace out these other phases, and to find from what immediate sources the parasites are derived, and in what forms they previously existed. It would then be possible to inquire *whether they could be destroyed in some earlier form*, or intercepted on their way to the grouse, or whether the conditions necessary to their great multiplication could in any way be withdrawn. For certain forms of human entozoa, notably for tænia and for the *Trichina spiralis*, the analogous facts have been made out, and the means of preventing the invasions of the parasites are fully known. Taking the *Tænia mediocanellata* as an illustration, the ovum is first swallowed in water or upon herbage by an ox, cow, or calf,

and when it enters the stomach of the animal, the outer membrane is dissolved and the embryo set free. The embryo, which is very minute, then bores its way out of the intestine, and through the structures of the animal until it reaches a suitable muscle, in which it surrounds itself with a cyst, completes one stage of its development, and is known as a beef measle. In course of time, if left unmolested, it would die. But if, while it is still alive, the animal bearing it is killed for food, and if the measle is swallowed alive by man, it at once enters upon a new phase of activity in his alimentary canal, and grows in a few weeks to be a tapeworm four or five yards in length, continually casting off segments full of ova, some of which find their way back to herbage or to water, are swallowed by cattle, and renew the chain of events. In like manner nearly every parasite has its first stage of development in some creature that is the natural prey of its ultimate host; the "measles" of the feline tapeworms, for example, being found in the flesh of rats and mice. The *Trichina spiralis* was first discovered by Sir James Paget in human muscle when he was engaged as a medical student in dissecting, but the history of the creature remained long unknown, and the nature of the trichinous disease, which at that time was very prevalent and often fatal in Germany, was wholly unsuspected. Sir James found the muscles of his subject looking as if they had been sprinkled with white sand, and each speck, on investigation, was shown to be a capsule, containing a minute coiled parasite. Ultimately, it was discovered that the muscles of the pig were liable to be in the same coudition, and that, when such flesh was eaten, the little coiled parasites awoke to new life in the human stomach, and produced young in countless myriads. The young immediately set forth to bore and wriggle through all the textures of the body in search of a new home in muscle, and their migrations, which in the aggregate produced what might be considered a formidable wound, were attended by very severe symptoms, which often end fatally. As soon as the young trichinæ reached muscle their work was done, they encapsuled themselves and remained dormant, and the patient, if he had so far survived their presence, would be likely to recover. In civilised society, trichinæ encapsuled in a human subject would be prevented from fulfilling their further destiny for want of cannibals to eat their host; but if this want were supplied they would at once become the parents of a new generation, and would enable their host, moreover, to take a terrible revenge on his consumers; Sydney Smith's well-known parting wish to Bishop Selwyn—that he might dis-

agree with the man who ate him—would be more than fulfilled upon savages who were unlucky enough to swallow trichinæ; and a single pig, marched into a German village and eaten there in the form of raw sausage meat, has before now proved fatal to a large proportion of the community. The knowledge of the foregoing histories brings with it the knowledge of the remedy—which is nothing more than the destruction of the life of measles or of encapsuled trichinæ by cooking. A temperature of 140 deg. is fatal to both; and meat which is even moderately well done must have been raised to 160 deg. at least. The facts, simple as they are when fully known, were only established by a long series of rigorously conducted experiments, and what is wanted in the case of the grouse parasites is to trace out their earlier history with similar care and patience. For such an undertaking we have every requisite in this country, excepting the recognition by grouse proprietors that a costly, prolonged, and arduous task is not likely to be accomplished by any scientific man out of considerations of pure love for the aforesaid proprietors themselves. The case is one in which a naturalist familiar with such subjects should be professionally consulted; and in which, moreover, according to the present aspect of affairs, he should be consulted before it is too late. Dr. Cobbold, from whose little pamphlet on the subject many of the foregoing facts are derived, expresses the opinion that there is room for further special investigation, the results of which might prove useful both practically and scientifically; but, with proper caution, he refrains from giving expression to conjectures as to the facts which the investigation might disclose."

The above anonymous article, evidently from the pen of some *savant* familiar with epidemiological and sanitary questions, was followed by a sensible letter, bearing the signature of "Q.;" the writer very properly referring to the part taken by scientific and professional persons in stamping out the cattle plague of 1866. The only liberty we have taken with this writer's letter, printed below, consists in the omission of the words "New Zealand," which he prefixes to that of the "Dodo." If our recollection serves us rightly there is no ground whatever for asserting that this curious relic of a past avian Fauna belongs to New Zealand. The Mauritius was, without doubt, its principal home:—

"The grouse has been to many possessors of moorlands a

valuable properry, to a still greater number of persons its pursuit has been a source of health and pleasure, while by not a few who neither possess moors nor shoot over them the bird has been prized as a luxury, and valued accordingly. The proprietors of moors and those who shoot over them, as well as those who being neither owners nor shooters still appreciate the grouse, are in a fair way of losing both the property and the pleasure. The grouse is being rapidly exterminated by disease; year after year the birds become more and more scarce on certain moors, and year after year the number of these barren moors increases. The disease has passed from the Scotch to the English moors, and is said to have reached the Irish moors. At the present rate of exterminating progress the British grouse will become, in a few years, as rare a bird as is the Dodo. The question immediately suggests itself, Can nothing be done to check this calamity? It seems to me that something might be learnt from the history of the Cattle Plague, which came upon us first nine years ago, in 1865. It is certain that by that pestilence not a beast would have been left alive in England had not the nature and origin of the disease been ascertained, and the proper remedy applied to stay its progress. The pestilence was attributed to dry weather and to wet weather, to hot weather and to cold weather, to the winds, to the food, to the waves of epizootic miasm, to electrical, and to causes still more absurd; at last scientific investigation came to our relief, confirming knowledge already purchased by sad experience abroad, and telling us that the spread of the disease was due to infection, and nothing else. A check was put on the spread of this infection, and the plague was stayed. It is thus with the grouse disease. Some persons attributed the malady to the birds eating too much young, green heather, some to their having no young heather to eat; some attributed it to wet weather, some to dry weather. Some see the origin of this trouble in the destruction of vermin, some in the destruction of the stronger and healthier grouse. As it was with the cattle plague, so it is with the grouse disease; we know nothing about it. It is true that in the vast majority of the starved, miserable birds abounding on infected moors, the intestines of the creatures are found stuffed with tapeworm; in other cases worms of another kind abound; in other instances it would seem as if a real intestinal fever existed. In all, the livers seemed more or less diseased. I mention these morbid appearances as fact. I have no explanation of them to offer; if I had, it would be probably unnecessary to make

the suggestion which I am about to ask your valuable aid in bringing before those who have, or ought to have, an interest in arresting the destruction of our grouse. The suggestion is that the proprietors of moors should form an association for the purpose of ascertaining the nature and origin of this plague, and if possible of putting a stop to its extension. They might obtain the same scientific aid as that which determined the nature of the cattle plague and put an end to it in this country. They have but to supply the necessary funds and the means of investigating the disease, to be found in abundance on the moors. If these gentlemen don't do this, if they trust to 'jubilees' and to such like charms, the grouse will pass from us, becoming a thing of the past, leaving behind nothing but the bleached skeletons, memorials of that which was once a source of profit, health, and pleasure."—["Q."]

In the *Lancet* of the same date there appeared a brief paper from Dr. Robert Farquharson confirming the facts observed by Dr. Cobbold as regards the presence of parasites, but disputing his conclusions as to the true cause of the malady. Dr. Farquharson thinks it is a contagious fever which carries off the grouse. On the 8th one M.D. writes to suggest that a new investigation should be made by Dr. Burdon-Sanderson, of the Brown Institution; and on the 11th "Another M.D." suggests that depôts of salt should be formed on the moors, because, to use his own words, "parasites and salt cannot live together." In what condition salt actually lives under any circumstances, this ingenious M.D. does not inform his readers. The value of salt has been well shown by Professor Simonds in the eradication of parasites which prove so destructive to young lambs when located within the fourth stomach, and its employment as a vermifuge is as old as the hills. Several other articles have appeared on the subject of grouse disease, including one from Mr. Tegetmeier in the *Field* of September 12th, who recommends that weakly birds be destroyed without mercy. A writer in *The Country* for September 10th maintains that the disease is due to the want of a good crop of "brockles" (*Juncus squarrosus*), on which the birds feed greedily. How truly has it been said that "some people are furnished with vivid imaginations."

In conclusion, we may remark that, according to the writer of a leader in the *Daily News* of September 25th—

"Some ardent sportsmen, weary of the obstinacy of the disease which has seized upon the grouse and threatened to destroy them, notwithstanding the various devices employed to arrest its progress, have determined to attempt the introduction of new game birds into this country. Already a cargo of the prairie fowl, or "American grouse," has been safely landed at Liverpool, and distributed among sportsmen and landed proprietors for the purpose of acclimatisation in Old England."

Supposing this experiment should prove successful, we shall only get a very inferior bird, and so far from any measures of a scientific kind having been adopted to arrest the disease, we believe that such a statement is entirely at variance with the facts of the case. No efforts, on a large scale, to stamp out the disease, and no investigations beyond those conducted by Dr. Cobbold, Dr. Farquharson, and other private individuals have as yet been instituted.

Review.

Quid sit pulchrum, quid turpe, quid utile, quid non.—Hor.

Parasiti interni degli Anamali Domestici. Manuale degli Entozoi del bove, della pecora, del cane, del cavallo, del majale, e del gatto. (Traduzione dall' Inglese e note del Dott. Tommaso Tommasi.)

In the October number of this Journal for last year we briefly noticed Dr. Tommasi's edition of Dr. Cobbold's book on human worms and their treatment. That little work appears to have been so well received in Italy that the publisher and editor have lost no time in translating and issuing Dr. Cobbold's recently published manual of the internal parasites of our domestic animals. Dr. Tommasi has added a number of useful footnotes, and likewise an important appendix in reference to the degree of temperature necessary for the destruction of Cysticerci in the flesh of cattle.

The subject is too large to be considered here at any length; but we shall hope to notice the experiments of Professor Pellizzari and Dr. Tommasi in a future number. Although all the illustrations of the English original have been reproduced by the Italian publisher (Mr. Civelli) he has issued the manual at the remarkably low price of two lire, which is equal to about one shilling and sevenpence of English currency.

Extracts from British and Foreign Journals.

CATTLE DISEASE AT NATAL.—REDWATER.

Government Notice No. 32, 1874.

His Excellency the Lieutenant-Governor directs the publication for general information of the following Report by the Commission appointed to inquire into the causes of the disease in cattle called in Natal "Red Water."

By His Excellency's command,

D. Erskine,

Colonial Secretary.

Colonial Office, Natal;
January 31st, 1874.

Report on the Commission of Red Water.

Surveyor-General's Office,
23rd January, 1874.

May it please Your Excellency,—

After a careful perusal of the evidence on the above disease, furnished by oral examination of witnesses, the answers obtained to the queries in the schedules which were sent to holders of stock, by the perusal of different communications which have appeared in the public prints, as well as by the results of our own investigations, we beg to submit the following Report,

And are,

Your Excellency's humble servants,

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I.—ANATOMICAL APPEARANCES.

In order to form an intelligent idea regarding the nature, causes, and treatment of Red Water, it is necessary in the first place to summarise the evidence collected in our investigations; and as the pathology of the disease must be the groundwork of our Report, we shall first notice the appearances presented in fatal cases, as summarised from the evidence collected in the answers furnished to the list of queries sent out.

a. Abdomen.

1. *Stomach.*

In the evidence taken by us, attention has been mainly directed to the abdominal organs as the seat of disease. No morbid appearances are recorded in connection with the first and second stomachs; but in our investigations we have noticed intense inflammation affecting both the *rumen* or paunch, and the reticulum or honeycomb.

The condition of the third stomach or manyplus is noticed by all; but the particulars given are for the most part confined to the contents of the cavity, and not so often descriptive of the condition of the organ itself. Its increased bulk and hard and impacted state are noticed, and its contents described as hard, dry, lumpy, baked, &c. The mucus lining of this viscus is in a state of intense inflammation. On denuding it of the blackish-grey epithelium which is seen to cover its entire surface, and which, being detached by the inflammatory process, readily peels off and adheres to the ridges of impacted grass between the folds of the manyplus, the mucous membrane is seen to be highly injected throughout.

The condition of the fourth stomach or *abomasum* is not noticed in any of the papers, but it partakes of the same inflammatory condition as the manyplus, though it is generally empty or partially filled with greenish mucus.

2. *Intestines.*

Little or no notice is taken of the intestines. In all the bodies we have inspected the canal has exhibited evidences of inflammation throughout its whole extent, and, in many cases, of a very severe type. We have found them empty, with the exception of more or less slimy mucus, sometimes mixed with pus, at other times tinged with bile or blood, lubricating their walls. In other cases they have been partially filled with knotty matter, these balls being composed of hard, dry, semi-digested grass, coated with slime, and sometimes with bloody mucus.

3. *Liver.*

The liver is described as large, out of order, inflamed, rotten, &c. The descriptions are very general, and of little value as to the real pathological condition of the organ. From our own observations, we have been unable to detect any morbid pathological appearance or alteration of texture; but it is always swollen, heavy, and congested to a very great

degree. When cut into, it presents a dark red colour, and blood flows freely from the divided vessels. The bile-ducts are more or less filled with the biliary secretion, sufficient, in many instances, to give a yellowish tinge to the cut surface. As all glandular textures, when saturated with blood, especially when sufficient time has elapsed to allow of softening of the parenchyma or substance proper of the organ, are easily torn, the liver often gives way in the course of handling, which has led to its description in many of the replies as disorganized or rotten.

4. *Gall-bladder.*

The gall-bladder is usually, though not invariably, found distended with viscid bile. The thickening of the lining membrane of the discharge-tube, which invariably takes place in an inflammatory condition of the liver or bowels, prevents the escape of the bile, and, as Niemeyer remarks, this condition of the duct often causes the gall-bladder to reach an enormous size.

5. *Spleen.*

The evidence collected almost unitedly testifies to the great enlargement of the spleen. In the majority of inspections we have made, this organ has been as there described; but we have also seen it little, if at all, larger than in the usual state of health; and some instances are quoted in the evidence of this having been observed by others. These exceptions show that an abnormal condition of this organ is not even an essential feature in the disease, far less its *essence*, as many of the observers have supposed. The spleen often attains to a vast size, simply by fluxion of blood, as in intermittent fever, or in obstructed engorgement, by a blocking up of the vessels conveying the venous blood from the hind quarters and bowels to the heart, as in diseases of the liver and some other organs; so much so that the human spleen, whose average weight and bulk are 7 ounces and 25 or 30 cubic inches, respectively, has been known to weigh from 10 to 20 lbs., and occupy a space of 200 to 300 cubic inches, from simple engorgement. That for the most part the enormously enlarged spleen seen in Red Water is the result of mere congestion, unaccompanied by alteration of texture induced by disease, is obvious from the suddenness of recovery which sometimes takes place in affected animals. As we have noticed respecting the liver, the tumefaction of the spleen is more or less accompanied by considerable softening of its texture, which renders it easily torn, and gives it the appearance of decay.

6. *Kidneys.*

The kidneys are variously described as very much inflamed, natural but gorged with dark blood, congested, &c. From the want of a correct standard as to what constitutes congestion and what inflammation, the various witnesses use very different terms to describe the same appearances. We have never observed the traces of inflammation of these organs, but always evidence of intense engorgement. It is well known that this state of congestion often results in the escape of blood from the venal capillaries, especially when the blood itself has undergone morbid alteration; and this we believe to be the source of the symptom by which the disease is popularly known.

7. *Bladder.*

The bladder is not adverted to in the evidence except as containing more or less of the coloured urine. We have observed its mucous lining deeply congested, but without evidences of inflammation.

8. *Peritoneum.*

No notice is taken of the peritoneal lining of the abdomen, which, indeed, was not to be expected, as it is more purely a professional texture, so to speak, than the other and more manifest organs of the body. This membrane, which covers the outer surfaces of all the abdominal viscera, and is the smooth glistening lining which is seen when the cavity is laid open, we have found presenting appearances of inflammation confined to limited surfaces irregularly disposed, and in many places, especially on the apron or *omentum*, there existed exudations of plastic lymph in round patches, apparently in the process of becoming organized.

b. Chest.

In some of the evidence adduced the heart and lungs are mentioned as having been found diseased. But the malady under investigation is so essentially confined in its course and symptoms to the abdominal organs as to convince us that these chest appearances have been for the most part fortuitous, with the exception of a softened state of the texture of the heart, which we have noticed in our *post-mortems*.

c. Fatty Textures.

An appearance of great importance has been noticed by

some of the observers, which is a yellow tinge of the fatty textures, indicating a jaundiced condition of the animal, from the absorption of biliary matter into the circulation.

II.—ETIOLOGY.

The light thrown on the etiology or causes of the disease in the evidence before us is very small indeed, and very contradictory. We have assigned as causes old grass and new grass; too fat and too lean condition of stock; too much work and too little; bad water and no water at all; neither pertaining to grass nor water, but purely atmospherical. It is affirmed to be contagious and non-contagious, epidemic and non-epidemic, &c. From such opposite opinions it is impossible to arrive at anything satisfactory as to the true cause, yet a certain value attaches to the opinions before us, as being the results of the observations of shrewd, intelligent, practical men. One evident deduction to be drawn from these opinions is, that the true cause of the disease must, to a certain extent, be ruled by the circumstances under which these observations have been made.

The following conclusions may be drawn from the returns before us:

Effects of Climate.

1st. That climate has no effect in arresting or even modifying the progress of the disease, so that, whether up-country or on the coast, the scourge is equally prevalent and equally felt. Hot weather may promote the conditions under which the causes operate, but, otherwise, temperature seems to have little influence.

Effects of Age.

2nd. Young stock under two years of age are rarely attacked, and stock in good condition take it most readily and fatally.

Effects of Change.

3rd. Removal of affected stock from one pasture ground to another, generally from a low to a high, seems to arrest the disease; in some cases permanently, in others only for a time.

Effects of Intercourse.

4th. In proportion to the number of animals trooped together is the disease most general and most fatal; likewise

in those localities which are visited by successive spans of cattle, as along the most frequented routes of travel.

5th. It seems to come out in the evidence that the more highly bred stock are most easily and fatally affected with Red Water. The largest and fattest kine are not always the most robust in constitution, and this point is well worthy the attention of stock-breeders. It is too important a question, and experience has been much too limited, for us to form an opinion as to its true value; but we commend it to the observation of practical men, whether an error may not be committed in sacrificing stamina of constitution and its adaptation to the climate as they exist in the small breed of the country, to the size and beauty and apparent strength of foreign and unacclimatised blood.

Contagion.

The question of contagion is of great importance, and demands special investigation. The testimony from the great majority of those who replied to the inquiries is against the contagious nature of the disease, and their opinions are founded on the following facts:

1. *Non-contagion Arguments.*

a. No pains were taken to separate affected animals from the healthy cattle, and no harm seemed to have resulted from this free co-mingling.

b. Frequently have animals been together in the same yoke, each breathing the air which had been discharged from the lung of the other, the one being the victim of Red Water, while its neighbour remained perfectly free from disease.

c. Singular instances occurring in a herd, under circumstances where, had the malady been contagious, it would have become general.

d. The facts noticed under the second and third conclusions mentioned above.

So general has the non-contagiousness of Red Water been borne out by the great majority of practical observers, that, as it were by general assent, the disease has been set down as not infectious or contagious.

2. *Contagion Arguments.*

Against this we have to set the testimony of a few witnesses, whose generally intelligent replies to the questions put to them argue that they have been close observers that

the disease is eminently contagious, although they do not say in what way or under what conditions the infection is propagated.

The first and fourth of the conclusions arrived at above, the creeping and progressive manner in which the disease first entered the colony and spread itself hither and thither, the as yet existing immunity of some localities isolated from the general traffic, abundantly show that there must exist some means of propagation to account for its mysterious march.

Contagion or infection may be viewed from two points, as it operates *directly* or *indirectly*, and we think the majority have arrived at their conclusions by observing that Red Water is not communicable from one animal to another in the same manner as other diseases known and recognised to be contagious—for example, Lung-sickness—and, so far, they are correct. But that disease is one of the respiratory system, and is directly communicated to healthy stock by the breath of the affected animal, or secretions from the air-passages, and by the tainted air surrounding it.

Mode of Propagation.

Red Water, on the other hand, being essentially a disease of the digestive organs, cannot be propagated directly, but requires another medium for its transmission, as the acting principle of contagion is contained in the ejecta of the animal dropped upon the soil.

Vegetable Fungi.

That the germs of contagion are thus eliminated from the diseased animal, and that the disease is communicated to others in a healthy condition by these germs being taken into the system, along with their injestæ, is capable, we think, of proof equal to demonstration.

Texas Cattle Disease.

In 1868 there appeared in America an epizootic possessing all the symptoms, and presenting the same morbid appearances, as we see in Red Water, only in a somewhat intensified degree. Attention was at once directed to arrest, if possible, this fatal malady, and investigations were instituted to ascertain its nature and causes. In tracing the progress of the disease, it was clearly ascertained that wherever diseased cattle proceeded, healthy stock feeding thereafter on the pastures were affected with the malady. It was a new

disease, and so distinctive in its characteristics, that it could not be mistaken. It came from Texas, and is known by the name "Texas Cattle Disease."

In June, 1866, a drove of Texas cattle passed through Vernon County about eight miles into the adjoining County of Bates, when the citizens would not allow them to proceed further, and they were sent back the same road they came. All remained well for six weeks, when the disease appeared along the route the Texas cattle had travelled, and not a farm beyond the point at which the cattle had turned back had a case of the disease. It was noticed, also, that when an affected herd was arrested by a deep stream of water, which the cattle could not cross, the disease never passed over, but where they could ford a river the water afforded no protection, clearly showing that the morbid or propagating matter was carried with the diseased animals, and left by them to be taken in by healthy stock which might afterwards feed on the affected pastures.

It was found, moreover, that the disease could not be propagated in any other way. Healthy and diseased animals were tied up together, a simple cattle fence being all that separated them; no evil results followed so long as they did not *feed* off a common pasture.

Thus far we have arrived at the manner in which the cause operates, though not at the cause itself; and ere we proceed further, it may be well to state certain facts connected with the germ mode of contagion, the application of which will go far to do away with many anomalies which may have perplexed observers of the phenomena of the disease as seen amongst ourselves.

Mode of Germ—Development.

In the first place, morbific matter, thus eliminated from a diseased organism, does not immediately produce its evil influence when imported into a healthy soil. It generally requires a period of "hatching," a term of incubation extending from ten to thirty or forty days, so that though an animal should appear for a month to be in a state of health after having been separated from his troop and living in solitude, he may then be cut off by virulent disease, the germs of which had been imbibed five or six weeks before. Again, such an animal, during these weeks of incubation, may be voiding unripe germs, which, being taken up by other healthy stock, will, when matured in them, produce the same fatal results. Again, it requires a certain susceptibility of the animal to be affected by the morbific matter, and in propor-

tion to this susceptibility will be the violence and rapidity of the disease. So much so may this be the case that an animal may swallow infected pasture, retain it for a time during a journey, and void it in a different locality, to be the cause of disease breaking out there, the *carrier* of the morbific matter remaining itself unaffected, being unsusceptible to the effects of the poison; as we see in the human family constitutions which are proof against smallpox or measles. Still further, every cause which tends to lessen the vital stamina of the animal, such as overloading, hurried driving, deprivation of nourishing food or good water, insufficient rest, previous debility or existing disease, and in the last place, but by no means of the least importance, the mental depression, excitement, and terror produced on the poor taxed animals by the brutal application of the lash and other means of torture, to goad the sufferers to unwonted exertion by not less brutal drivers, will tend to increase the constitutional susceptibility to the operation of such morbific matter, as well as diminish the vital power of throwing off such when imbibed.

Asiatic Cholera—Mode of Propagation.

The nearest parallel to this disease in the manner of its communication, observed in the human family, is Asiatic cholera, and modern researches have very clearly shown that this disease is propagated alone by morbific germs contained in the dejecta of those affected, and that, unless by the reception of these germs into the organism, no water, however foul, or food however tainted, or even putrid, will produce the disease. There are other ways, however, than by the food by which choleraic matter is introduced into the system, for the handling of tainted clothes, and the changing and cleansing of soiled linen, and the constant intercourse between patient and attendants, afford great facilities for the propagation of the disease, and were it not for an ascertained fact that the cholera germ does not assume its virulent character until the lapse of some days after its ejection, the direct communication of the disease to physicians and nurses would be much more frequent than it actually is.

Like the Texas cattle disease, cholera has been traced along those routes alone where the germ has been proved to have been carried by individuals, by drains receiving the dejecta, by soiled clothing, &c.; so much so that in the words of Mr. Simon, one of the Commissioners, as we believe, appointed by the Privy Council to investigate this matter, "it cannot be too distinctly understood that the person who contracts cholera in this country is, *ipso facto*, demonstrated with

absolute certainty to have been exposed to excrementitious pollution, excrement-sodden earth, excrement-reeking air, excrement-tainted water; these are for us the causes of cholera."

Sporadic Cases.

True enough, sporadic cases occur in both diseases where the connecting link may remain untraced, but if we refer to what has been said respecting the laws which seem to govern the spreading of the infection-germ, and take into consideration the subtle and unpalpable nature of the contagious principle, and the bearing of well-ascertained facts under circumstances where the disease was obviously communicated in this manner, we are forced to the conclusion that the specific cause has reached the isolated animal in *some way*, though it may be undiscovered by us.

But it may be asked, is there any proof of the existence of such a morbific germ to which so much importance is attached? Medical science is almost purely one of deduction, and enough has been said to prove the almost absolute certainty of the propagation of Red Water from one animal to another by the reception of specific matter into healthy stock, which matter has been voided by diseased animals. But investigation has gone further than this. Dr. Styles, one of the American Commissioners in the Texas scourge, carefully examined the blood and bile of *healthy* animals microscopically, and found these perfectly free from certain forms which were very abundant in the bile or blood of diseased stock. These fluids, when taken in a fresh state from the latter, were seen to contain minute vegetable germs, which, after a while, became much more visible from multiplication of their number and their further development. They assumed the form of Torulæ cells, which is the simplest form of fungi, and which is seen in the well-known yeast plant. It consists of a single oval cell, enclosing a granular fluid. It multiplies itself by a process of budding. A small nipple projection takes place at one end; this soon enlarges, and a neck is formed between the new production and the parent cell. This constriction gradually contracts, and at last cuts off the infant cell, which becomes an independent formation. Some of these Torulæ were taken from the blood and bile, and transplanted into different vegetable solutions, and their development watched. In the course of a fortnight these solutions were found covered with penicilium, a higher form of vegetable life the fungus, whence originate these Torulæ, is said to be a

species of the genus coniothecium, a parasite growing on plants spread over cattle pastures.

It is thus apparent that we find in the blood and bile of diseased animals a vegetable germ, absent in healthy subjects, which germ has been recognised as originating in a fungus growing in pastural lands. It has been proved by experiment that this germ seems to find a congenial soil in the animal fluids, and multiplies there with great rapidity, producing the disorganized state of the vital fluids and the various phenomena which form the sum of the disease in question. But, it may be asked, wherefore this necessity of assuming that the excrementitious matter of diseased animals must be the medium of conveyance of the morbific germ? Why is it that all stock, cropping the same herbage, are not affected simultaneously and directly by the common partaking of the same cause? The first question receives sufficient answer in what has already been stated as to the manner in which the Texas epidemic was traced, and the conclusions there advanced have been strengthened by the parallel we have drawn between that disease and the facts known with respect to the spread of cholera, so that the matter has, we conceived, passed from the arena of assumption to that of fact.

To the second we reply that it is quite consistent with all we know to assert that until the fungoid-germ meet with a constitution adapted to develop its morbific effects, it may be swallowed with impunity; but there may be, and in all probability there actually is, a vitalising force in the animal elements, which, when the germ is roused into activity, may vastly increase its propagating power. Again, the fungus is not necessarily found in every district, any more than is any other of the well-known diseases which attack vegetable productions, invariably universal. We experience seasons when the potato blight comes as a scourge, when the vines succumb to the attacks of the oidium, when the rust destroys the hopes of the husbandman; and we know that certain localities may be wholly exempted while others suffer severely, but the reason why is as yet beyond our ken.

Experiments on Animals.

In order still further to test the effects of the vitiated fluids of the victims of the Texas plague, rabbits were fed upon the bread soaked in the diseased bile, and the animals died in one to four weeks, according to the amount of bile consumed, and their bodies exhibited many of the phenomena of the Texas disease in a chronic form.

Applying the foregoing history of the cause of Red Water, and the manner of its propagation to the general conclusions drawn from the practical experience of the numerous observers, as summarised from their replies in a former part of this Report, we see how it is—

1st. That climate has no effect in causing the disease, though a high temperature and moist atmosphere may promote the maturity of the fungus, or germ.

2nd. That young stock are so rarely affected, being dependent on their mothers for sustenance, and kept apart from the older and more exposed stock, until of strength to be trained for useful purposes.

3rd. That the removal of stock to a different run may modify or arrest the disease, by withdrawing the animals from the matured fungous germs, and the tainted air of the contaminated locality; also how the cessation of the plague is in the majority of instances only for a time, and generally just so long as we have shown to be essential to the maturing of the transported germs, and transforming them into new centres of disease.

4th. That the disease is worst and most general where cattle are most crowded, or in places which are most frequented.

Finally. From what has been said under the mode of germ development, it will be seen that the assumed proofs of non-contagion previously recorded receive a full and satisfactory answer, and that explanation has been given why in many instances no directly contagious results were traced from the co-mingling of healthy and diseased stock; also the reason why affected may be placed alongside of healthy animals, and no transmission of disease take place; and, how isolated cases may be accounted for.

Symptoms and Course.

The following are the symptoms of the disease, put down as nearly as possible in the order of their succession. It will be understood that all the symptoms are not observed in every case:—

Dulness and listlessness; drooping of the ears and hanging of the head; often wandering from troop and standing alone; disinclination to work or even to move, and, when urged, a strong disposition to lie down; loss of appetite; weakness, and dragging of hind-limbs; fever, with quick pulse; dry and parched mouth and nostrils; and often quivering and tremulousness of skin; sometimes the eye is wild, but if the

weakness be great, it is dull and heavy; hair staring, especially about the four-quarters and neck. As the disease advances, the obstinate constipation which existed from the commencement still continues; the flanks are much drawn in; the tongue and mouth assume a slate-coloured coating; saliva dribbles from the mouth; the breathing becomes heavy; the head is often swayed from side to side, or there is grinding of the teeth, as if the animal was in pain; Red Water is now plentifully passed; the beast becomes weaker, and cannot move without staggering; the eye becomes filmy, and the animal falls unable again to rise; and death soon puts an end to the scene.

Of these enumerated symptoms many are common to other maladies, and are associated with progressive weakness arising from acute diseases of different natures. So much is this the case that in the evidence before us many have failed to discriminate between the disease in question and Lung-sickness. The symptoms peculiar to and pathognomonic of Red Water are:—Loss of appetite, associated or accompanied with obstinate constipation, dragging of the hind-quarters, drawn-in flanks, the dribbling from the mouth, the peculiar way the solitary animal stands with the hind feet put far forwards, to relieve the tension of the abdominal muscles, and, lastly, the appearance of Red Water.

III.—PATHOLOGY.

The *post-mortem* appearances are indicative of—1st. Inflammation, involving principally the stomachs and intestines; 2nd. Intense hyperæmia, or congestion of the liver, spleen, kidneys, and other abdominal viscera; 3rd. A disorganized state of the blood.

As the most intense morbid condition indicates the seat of e primary disease, we conclude that the stomachs are the th rts primarily affected.

The intense engorgement of the other abdominal viscera depends on the relaxation of the vessels, and the irritation s t up in the respective organs by the poison circulating in the blood, but chiefly by obstruction to the *portal circulation*, owing to the congested and swollen state of the liver. The blood sent to the abdominal organs has all, in its return to the heart, to pass through the liver, and when this organ is congested, a stagnation more or less complete takes place, and the viscera become engorged. Often in this condition of the liver, when no alteration in the condition of the blood

exists, the tension of the kidneys is so great that rupture of their coats take place, and blood escapes into the bladder, to be voided with the urine. In this disease, where the character of the blood is altered, and its corpuscles destroyed by the presence of biliary matter, the blood becomes much more liable to be extravasated, and escapes through the renal capillaries much more readily. That bile is present in the blood in Red Water is proved by the yellow tinge given to the fatty deposits of the body, and that the corpuscles are thereby destroyed, we believe, for we have failed to detect them by the microscope in urine taken from the bladder of an animal dead of the disease.

As the disease advances, and the blood becomes more vitiated, a state of constitution is induced somewhat resembling scurvy in the human frame, when extravasations of blood become generally diffused; and on skinning the dead carcase, large blotches of ecchymosed blood are met with, the thin and watery fluid having escaped from the relaxed vessels from the slightest pressure.

Thus it is, by continuance of inflammatory fever, perverted function of the liver, arrested secretion of healthy urine, and rapid weakening of the whole system by sanguineous discharge from the congested kidneys, all primarily induced by the introduction into the system of vegetable fungoid matter along with the food, that the malady is so rapidly progressive in fatal cases.

Treatment.

The treatment naturally divides itself into prophylactic and curative, and must be adapted to animals at home and oxen on the march.

a. Prophylactic.

The first point to be strictly attended to is the isolation of stock on the first suspicious symptoms of disease, not only to undergo the curative process of treatment, but that the surrounding herbage may not be poisoned by the excrementitious matter voided by the affected. The cause of the disease having been so fully dwelt on, each individual stock-holder will know best how to effect this according to his facilities and conveniences. The animals should be confined in a kraal of limited dimensions. The space should be repeatedly and plentifully sprinkled with impure carbolic acid, diluted with water. This agent is the best, cheapest, most portable, and easily managed of all the disinfectants with which we are at present acquainted. Daily the excrement voided by the

animals should be raked together, and removed to a pit previously prepared, and immediatcly covered with a layer of soil from eighteen to twenty inches in depth. Where the great routes of traffic extend, kraals ought to be erected at convenient distances for the reception of diseased stock, and the same disinfecting process put into operation there. These kraals should be in localities where they could be supplied with plenty of wholesome water. We cannot too severely censure the practice of animals being allowed to drop on the road-sides and remain unburied, let alone the deleterious effects that putrescent animal matter exercises on the surrounding atmosphere, especially in districts near human habitations or outspanning stations; the decaying carcases form fostering beds for the development of the fungus germs, and thus perpetuate the existence of the malady.

It is the custom of many stock-holders, if the disease makes its appearance in their herds, to dose all round at regular intervals during its continuance. This practice has its recommendations, inasmuch as it may rid the apparently healthy portion of stock of the lurking germ before it has attained maturity so as ultimately to produce disease, but this should be done so that the excrement may be disposed of in the manner pointed out above.

In this way may the disease be stamped out when it makes its appearance in a locality, as it, as far as possible, prevents the contamination of the surrounding pasture.

b. Curative.

In the curative treatment four things are indicated—

1st. To rid the stomach and bowels of the impacted and imperfectly digested grass, which, in the inflamed state of the organs and perverted functions of digestion, acts as a poisonous irritant.

2nd. To afford facilities for the escape of the poisoned and fungus-laden secretions from the system.

3rd. To destroy the parasite within the animal as far as possible; and

4th. To sustain the *vis vitæ* of the animal during the course of the malady, and restore it during convalescence.

With respect to the first of these indications, as it is obviously absurd to rid the animal of the hard and impacted grass and at the same time permit it to continue to feed at random and refill its stomachs as before, it should be cut off from all green food. The next point to be attended to is in cases of constipation to have the bowels freely opened, and

kept moderately so by the successive exhibition of purgative medicines, the doses of which ought to be in proportion to the strength of the animal affected. It ought always to be borne in mind that this disease, in which the blood undergoes extensive morbid change, is one of itself calculated to bring down the vital strength of the animal with astonishing rapidity, and that over purgation is an additional lever calculated to effect the same end. At the same time it must not be forgotten that the bowels and kidneys are the two principal emunctories, whereby the second indication in line of treatment is to be effected; and that a good supply of water to act on the kidneys, and as it were "flush" the system in this way, and the sustaining of a constant action of the bowels, suited in its extent to the powers of the animal, are the two principal ways in which we can assist nature in her attempts to get rid of the poisonous matter circulating through the system. So much is this the fact, that Youatt truly observes with emphasis:—"In the majority of cases, and especially before the strength of the animal becomes exhausted, *the commencement of purging will be the signal of recovery.*" (Page 507.)

To effect this, all irritating and drastic purges must be avoided, as the inflamed condition of the stomachs point out. Croton oil, podophyllin, turpentine, gamboge, and the like ought not to be employed. Linseed and castor oil may be used with safety, in repeated doses of half a pint of each in mealie gruel, until the effect is produced, or Henry's solution, given in the same way. This valuable medicine is prepared by boiling sulphate of magnesia in water, and allowing it to cool. There should be sufficient sulphate to saturate the water. After it has cooled let the liquid part be poured off, and have added to it one seventh part of diluted sulphuric acid, which is prepared by mixing one part of strong acid with seven of water; a teacupful of this solution ought to be given every four hours, plentifully diluted with gruel, until purging is produced, and then the dose diminished in strength and given at longer intervals, so as to keep up a gentle action on the bowels.

The third indication may be effected by prescribing carbolic acid internally, either with the food or medicine. If the Henry's solution be used, it will be necessary to administer the carbolic acid at a different time with the food or drink. The following prescription was found to be taken readily by the oxen in America:—Carbolic acid, 12 ozs., in crystals; glycerine, 4 ozs.; bicarbonate of soda, 12 ozs.; mix. Directions:—Dissolve or mix one ounce in three or four

gallons of water, and put before the animals. When this mixture is refused, it will be necessary to administer a bottle of it now and again along with gruel.

In the fourth place, there is an obvious necessity for sustaining the strength of the animal during the continuance of the disease, and this must be effected by such food as will be most easily digested and contain most suitable nourishment. This will be found in thin mealie gruel, and it ought to be given, freely flavoured with salt, at very short intervals, should the animals refuse to take it willingly.

As soon as the symptoms begin to be mitigated in severity the return to green food should be begun, and this should consist of the tender parts of green mealies or green succulent forage, food which has not had the opportunity of having been contaminated with excrementitious matter.

In cases of great debility the Henry's solution might be given in strong infusion of quassia or gentian root; and stimulants in the form of rum might even be added to tide them through the stage of greatest weakness, when they suffer at the same time from the draining effects of opening medicine and nervous depression from poison in the blood.

During convalescence the exhibition of five or six grains of quinine, along with five of sulphate of iron, and half a teaspoonful of diluted sulphuric acid, in a pint of water three times a day, would do much to restore the strength and improve the quality of the blood.

When the disease is prevalent along the routes of traffic, we would earnestly urge that at the outspanning places on the road, supplies of forage should be kept, so as to make the cattle entirely independent for their sustenance of the pastures surrounding such spots, which are those most likely to be infested with the poisonous germs from infected stock which have gone before.

There may be a difficulty in doing this, from the limited amount of forage raised and ready, but during the next few weeks, while the grass is not overripe, we would suggest that transport-riders should combine, and mow eight or ten acres of grass at convenient distances along their respective routes, and manufacture it into hay, to be stacked and preserved for their use at outspanning stations. The grass thus set apart should be cut at considerable distances from the outspanning place, so as to be free from contamination, and while it is soft and succulent and full of nourishment. The winter herbage, it is well known, is almost worthless for purposes of nutrition when work is expected from animals fed thereon; and were the value of hay, prepared from the natural grass cut and

dried in the proper season, January to April, fully known and recognised, and practically applied, we would hear no more of the poverty of stock during the winter months.

Conclusion.

In framing this Report it has been our aim to summarise the experience of practical men in the colony, to bring what knowledge we ourselves could to bear on the subject, and to avail ourselves of the experience of others. We trust that our labours will be productive of good; but unless some simultaneous effort is made to follow out the principles laid down, very little permanent benefit will follow. One careless or ignorant possessor of stock may be the cause of very serious injury to his neighbours around, and they, let them do their best, to others. What measures it may be advisable to adopt to prevent this, if any, His Excellency in Council will judge. In the meantime, as we feel that much, especially in the matter of treatment, remains to be investigated, we would humbly suggest to His Excellency that skilled persons should be selected and empowered to purchase diseased animals, for the purposes of pathological examination and experimental treatment; the results of their investigations to be reported upon to His Excellency at a future date.

ON A HANDY METHOD OF EXAMINING MORBID NERVOU TISSUES MICROSCOPICALLY.

By J. Batty Tuke, M.D., F.R.S.E., F.R.C.P.E.

The great obstacle in the way of examining microscopically the tissues of subjects affected by disease of the nervous centres, has been the laborious nature of the work involved in preparing specimens, and in cutting, tinting, and setting up sections. The examination of fresh specimens of brain and cord has been urged by myself and others as an important part of a necropsy in such cases; but it must be confessed that the results obtained by squashing out small portions of nerve-tissue under a covering-glass have been in no small degree unsatisfactory, inasmuch as lesions of individual constituents have been extremely difficult of recognition; and further, in many cases, it has been found impossible to distinguish between morbid appearances and normal structures. This process has served to demonstrate fuscous degeneration of cells, and to suggest the presence of certain other abnor-

malities; yet an element of doubt must have often existed in the mind of the conscientious observer as to certain important points. But all doubt as to the actual nature of what one sees in fresh specimens can be obviated by adopting the following simple process:

Take a portion of nerve-tissue, about the size of a large pin's head, from a thoroughly defined locality, squash it out gently under a covering-glass on a slide, remove the covering-glass, and apply to the mass left on the slide a drop of "Judson's simple (aniline) magenta dye," diluted with eight drops of water; with a needle, mix the dye and the nerve-matter carefully, and cover the preparation with a clean covering-glass, again gently pressing it out to such an extent that light can pass through it. On submitting a specimen thus prepared to the microscope, it will be found that the cells, the nuclei of the neuroglia, and the blood-vessels, are beautifully tinted a deep crimson colour, leaving the other tissues almost unaffected. As far as my experience has gone, morbid products are also well brought into view, either by their ready absorption of the dye, as in the case of amyloid bodies, or by their refusal to take on the tint, as in the case of colloid bodies. Hæmatoidin accepts the colour all too readily, but the practised eye soon recognises its appearance. Pigmentary degeneration of cells is well shown, nucleus and nucleolus being thoroughly demonstrated; the poles can also be traced for long distances. A little practice will enable the observer to detect changes in the nuclei of the neuroglia, both as to their individual character and degree of proliferation. A specimen thus prepared presents many aspects more beautifully than can be obtained by the thinnest section I have been able to make; it can be viewed by the highest powers, and, moreover, an objection which has been raised by those who know little of the subject against prepared sections, viz., that the appearances presented by them may be the result of the "pickling" to which they have been subjected, is to a very great extent obviated.

Whilst this process affords a handy method of examining morbid nervous tissue, it can only be advanced as such; it does not supersede sections; for, of course, the nerve-elements are not shown *in sitû*. In order to render a *post-mortem* examination thoroughly satisfactory, the condition of the tissues must be studied in their relation one to the other; still, it is of no mean importance for the pathologist to be able to say definitely that the vesicular or nuclear elements of such and such a tract were demonstrated to be abnormal in kind or quantity. This can be done with considerable

accuracy by the "handy process." In two hours the pathologist can go over all the parts of a brain and cord, and, if he have any experience of the examination of nervous tissue by the section-process, and know his anatomy with an ordinary degree of accuracy, he can arrive at results of an important nature in a short time. But, if he desire to make assurance doubly sure, or to substantiate a theory as to the absolute nature of a case, he must prosecute his inquiries till he can view the lesions *in sitû*, which, of course, entails microscopic sections. I may here remark *en parenthèse* that the most satisfactory results which I have been able to obtain in section-cutting have been by following Betz's method (vide *Journal of Mental Science*, October, 1873, p. 465). I have not yet made any experiments as to the best method of permanently preserving fresh specimens prepared by this handy method; but I believe that careful manipulation will enable them to be set up in glycerine. It is more than probable that this process will be found useful in the examination of other morbid tissues.—*British Medical Jonrnal.*

SCHUTZENBERGER ON COMBUSTION IN THE ANIMAL ORGANISM.

The researches of MM. Mathieu and Urbain establish clearly that fresh arterial blood, preserved at a temperature of 98·6° to 104° Fahr., consumes the oxygen united to the hæmoglobin with extreme slowness. Schutzenberger finds that oxygenized blood, preserved also at a temperature of 98·6° Fahr., loses its oxygen very slowly while the blood is fresh; but that, when putrefaction sets in, the loss is very rapid. This he considers to bear out the generally admitted principle that these combustions take place especially in the depth of the tissues. These organic tissues act by their cells on the oxygen as do the cells of the yeast of beer. It is well known that the yeast of beer possesses the property of absorbing oxygen, with production of carbonic acid. Schutzenberger has investigated the absorbent power of yeast, and says that he has discovered some of the principal laws. Great similitude, from a chemical point of view, exists between the products elaborated by yeast and those formed in the tissues of the animal organism. This similitude led him to the idea of transforming arterial blood into black venous blood by analogous means, transformation quickly and successfully effected.—*The London Medical Record.*

Paget Higgs, D.Sc.

Analysis of Continental Journals.

By G. Fleming, M.R.C.V.S., Royal Engineers.

UNIVERSITY OF BRUSSELS.

At its meeting on July 4th, the Administrative Council of the Brussels University elected Professor Wehenkel, of the Cureghem Veterinary School, to be lecturer on pathological anatomy. The Veterinary School of Belgium has now given three of its graduates to the professional staff of the University: M. Dewilde, as lecturer on chemistry; M. Derache, for zoology and comparative anatomy; and M. Wehenkel, for pathological anatomy.

ARMY VETERINARY SURGEONS DURING WAR.

An important question has arisen since the late Franco-German war as to the position or *status* of army veterinary surgeons during active service. TheGenevaConvention, as is well known, recognised medical officers as non-combatants, and therefore exempt from being made prisoners of war; consequently not liable to be subjected to those severe measures which befal combatant officers either on the field of battle or after capture by the enemy. Their mission preserved them, in fact; and the Geneva red cross they wore was a guarantee that they did not play the part of active belligerents, but only performed those humane offices pertaining to their calling. By a strange and unaccountable oversight, veterinary surgeons were omitted from the red-cross clause; and the consequence was, that during the late war they were treated as combatant officers, and had to submit to all the chances of active warfare which these have and expect to encounter. Many of our French colleagues had to endure all the rigours of captivity and the risks of the field, though they never drew sword nor went into action, except to perform their special duty, which is an essentially humane one, and is certainly as deserving of recognition as that of the human surgeon.

We learn that the Russian Government, at the Congress now being held at Brussels to discuss an international convention relative to the laws and usages of war, does not propose any modification in the status of medical officers, but in the proposals it has drawn up allows them the same exemptions they received from the Geneva Convention.

With regard to veterinary surgeons, however, they are considered on the old footing of combatant officers, and derive no immunities through their calling; though they are no more combatant members of an army than the surgeon or apothecary, are never designated as combatant officers, and are not eligible for the honours and other advantages to which these are.

We are, therefore, much pleased to notice that Professor Thiernesse, Director of the Brussels National Veterinary School, after having conferred with Baron Lambermont, the Belgian Plenipotentiary, is about to present a petition to the Congress, praying that army veterinary surgeons may be included with medical officers, and treated as non-combatants during an engagement, or in the event of capture. British Army veterinarians, at least of this generation, have not had the painful experience of our French confrères; but a European war might expose them to the same unfortunate reverses and undeserved treatment. We will, therefore, look forward with some amount of anxiety to learn the result of the application. Professor Thiernesse is in a position to speak strongly on the point, as after Sedan many veterinary surgeons of the French Army took refuge in Belgium, and their plight was not the most enviable. If debarred the honours and privileges of combatants, it is scarcely fair that they should suffer equal peril at the hands of the enemy.

CONTRIBUTION TO THE ETIOLOGY OF CHRONIC ROARING.

Among the many causes which give rise to chronic roaring, Professor Lorge, of the Brussels Veterinary School, has had occasion to study one in a horse destined for the dissecting room. To facilitate his description, Lorge divides the trachea into three portions, with regard to its cervical relations, distinguishing them into middle or body, and two extremities. The upper extremity consisted of three rings, which were normal. The inferior extremity had also, before entering the chest, two well formed rings. But the middle portion, instead of being flattened before and behind, was so laterally, in such a manner that the natural margins of the rings were transformed into faces, and the latter into borders. The right face was rounded, and showed transverse grooves corresponding to the intervals between the constituent pieces of the trachea. The left face was alternately convex and concave in the direction of its breadth; being convex in its anterior third, and concave for its posterior or superior two thirds. Its convex portion

offered the same peculiarities as the right face, but the concave portion was entirely membranous, and afforded lodgement for the œsophagus. The anterior or inferior border did not exhibit anything remarkable, being rounded, passing insensibly into the faces, and corresponding to the anterior aspect of the trachea, considered in its normal condition. The other border was posterior or superior, thin and sharp, and constituted by the right extremity of the cartilaginous rings. The ends of these rings were widened and thin, and did not look towards each other, as is naturally the case: the left extremity being alone incurvated, and the right linear, and so developed that its maximum width was ten centimètres.

Otherwise, the rings were united at their border, as usual, by means of the intermediate ligaments which permit the lengthening or shortening of the tube they concur in forming, these ligaments being mixed up with a thin connective layer joining the extremities of the rings. This layer was five centimètres wide, to correspond with the space between the enlarged extremities, and on it the œsophagus directly rested. The muscular membrane, strange to say, in nowise differed, with regard to arrangement, from the normal state, being formed of transverse fasciculi attached by their extremities to the inner face of the cartilages, at points corresponding to the posterior surface of the healthy trachea.

The other respiratory organs did not present any lesion likely to give rise to chronic roaring; and Lorge, therefore, believed himself justified in concluding that this deformity of the trachea was the cause. No information could be obtained as to the antecedents of the animal, but it was believed that, owing to the altered relations of the œsophagus to the trachea, the symptom of "roaring" must have been more particularly manifested while the animal was eating.

AN EFFICACIOUS MODE OF PREVENTING COWS FROM SUCKING THEMSELVES OR OTHERS.

Urbani André, Government Veterinary Surgeon at Fleurus, Belgium, in remarking that cases are not rare in which cows acquire the pernicious habit of sucking others or themselves, alludes to the contrivances in use for correcting this propensity. That most frequently employed is a head-collar, with the nose-band garnished by long sharp iron spikes projecting outwards. These points, of course, cause painful punctures when the animal attempts to indulge in its vicious practice. Another contrivance is a surcingle around the body,

furnished with a ring on each side, from which is a cord passing to the horn of the corresponding side; these cords hinder the cow from turning its head so far round as its own teats, though they will not prevent it reaching those of others.

André proposes a more simple and efficacious means than either of these. This is the ordinary nasal *bouclement* or ring in the nose, which has been perfectly successful in two cases described by him, and in which the spiked nose-band failed.

COÏTAL EXANTHEMA IN HORSES.

We learn by a circular issued by the Governor of Brabant to the Government Veterinary Surgeons and Communal Administrations, that M. Devleshouwer, Government Veterinary Surgeon at Londerzeel, has reported an outbreak of coïtal exanthema in his district. The Governor refers to this veterinarian's description of the occurrence as follows:—"During about three weeks I have had to examine twenty brood mares suffering from *coïtal exanthema*. This affection, also designated 'syphilis of the horse,'* consists in an eruptive inflammation on and around the genital organs of stallions, as well as mares. The pustules which appear burst, and give rise to ulcers, which are sometimes isolated, and at other times become confluent, forming large denuded patches. The malady is contagious, and from the information obtained, it was the stallions of an owner at Opdorp (East Flanders) which were first affected, and communicated the disease to the first eighteen mares I was called upon to examine." The Governor adds that, according to Devleshouwer, astringent and slightly caustic lotions quickly cure the disease, though it is acknowledged that it is capable of assuming the characters of a very deadly epizoöty. Attention is therefore called to the existence of the contagion; so that if the Government Veterinary Surgeons, or other responsible functionaries, discover any cases in their districts, steps may at once be taken to prevent its extension.

VETERINARY SCIENCE IN JAPAN.

The *Journal de Médecine Vétérinaire Militaire*, for November, 1873 (which has now only come to hand), announces that an army veterinary sugeon is about to be attached to the military mission France is sending to Japan; and that the French War Minister has issued a notice to those candidates who are desirous of availing themselves of this oppor-

* This is not the curious, and nearly always fatal, malady, known to Continental veterinarians as the *coïtus*, *chancrous*, or *syphilitic disease* of horses.

tunity, that the Japanese Government will grant a sum of about three hundred dollars per month (about £70) to the officer so appointed. Of course his military pay will cease.

No doubt a judicious appointment will be ensured by the French authorities, and we anticipate much benefit to veterinary science from the selection made. From our experience of diseases among animals sent from Japan to North China, and our knowledge of the peculiar aptitude of the Japanese themselves in observing everything that is noteworthy with regard to animals, we have yet much to learn with regard to comparative pathology in that distant part of the world. The superior training of the French veterinary surgeon should yield good fruit in this respect.

PHENATE OF AMMONIA.

Dr. Déclat, who has been for some time engaged in researches relating to the therapeutic properties of phenic (carbolic) acid, has sent in a paper to the French Academy of Sciences on the effects of ammonia and this acid in cholera and the bite of serpents. Regarding the latter, the injection of ammoniacal water into the veins has been practised with extraordinary success, both in America and Australia; but, unfortunately, these cures have been constantly followed by partial gangrene, more or less dangerous, showing that ammonia should not be administered alone. On the 31st of May, 1869, the author had entrusted to the Academy a sealed packet, which was opened on the 27th of September, 1873, and found to contain a proposal of his, to the effect that, instead of ammonia, its phenate should be used in subcutaneous injections, and if necessary even in the veins, as a cure for what in sheep is called "splenic apoplexy" (*sang de rate*), and, by analogy, for cholera, which is a ferment disease as much as the other. This view was supported by the case of a sheep that had recovered, when on the point of death, by the injection of phenate of ammonia into the veins. In 1873, at Venice, he had advised the faculty to inject into the veins of choleraic patients at the stage of cyanosis, and also before, if other treatment did not succeed, from twenty to twenty-four drops, and more, if necessary, of the watery solution of the phenate in the proportion of 1 per cent., but about a drop at a time, until the liquefying and antifermentescent effects of the liquid should have caused the recovery of the patient. None of the injections so performed, upwards of 1000, led to any gangrene. Dr. Déclat is confirmed in his previous opinion, that, while ammonia liquefies the blood in all cases of cyanosis and local congestion or inflammation,

phenic acid combined with it prevents the morbid fermentations that are the cause of cholera, typhus and scarlet fevers, measles, small-pox, acute bronchitis, malignant fever, &c.

THE BITE OF THE SKUNK.

In the last number of the *American Journal of Science* there is an article by the Rev. H. C. Hovey on "Rabies Mephitica," which contains some rather startling warnings to travellers and sportsmen going "Westward Ho!" The common skunk ("Mephitis mephitica"), of which thousands are killed annually for the fur trade, is by no means the weak, timid, harmless creature commonly described by naturalists. A poison is sometimes contained in its saliva, which produces results very analogous to those arising from the bite of a mad dog, with this important difference, that the skunk bite seems to lead to almost certain death. Mr. Hovey has obtained particulars of forty-one cases of "Rabies mephitica" occurring in Virginia, Michigan, Illinois, Kansas, Missouri, Colorade, and Texas, and all of these were fatal except one. That was the case of a farmer who was twice bitten, and is still living; he was aware of the danger, and used prompt preventive treatment. Mr. Hovey thinks that the symptoms which follow the bite of a "mad" skunk are sufficiently distinct from the disease known as "Rabies canina," that he proposes the name "Rabies mephitica," and gives the diagnostic indications.

RABIES IN NEW YORK.

There appears to be much alarm with regard to the prevalence of rabies among dogs in New York, and a number of people have died from hydrophobia. We find the usual amount of ignorance of the disease playing a large part in its dissemination and fatal consequences, and people who know nothing whatever about it are most active and persistent in giving their opinions. Indeed, this malady of all others appears to be chosen by the would-be-considered wise impostor, and, as in this country, the most dogmatic are those who know least. The "dish-of-water" farce has cost some lives—it is a pity that those who spread such nonsensical fallacies are not made responsible for their pernicious teaching; and one of the latest victims has certainly been "hoist on his own petard." One or two examples of the same kind would do good in England, and the country would not be much the worse for the individual loss. We read in a New York paper, recently received:

"A very recent and somewhat remarkable case is that of the late Dr. Francis Butler, of Brooklyn, New York, who died of hydrophobia June 16. He was an educated man, the author of a book upon the breeding and diseases of dogs, and of late years had made the training of these pets his especial occupation. He was almost a total disbeliever in the reality of the transmission of any poison or disease from animals to mankind. He entertained the view, promulgated by Dr. Brown-Séquard and others, that hydrophobia in man is simply a nervous disorder brought about by the imagination. In his various publications, Dr. Butler has given many directions about the proper treatment of sick and mad dogs, and has shown how easily all persons bitten might cure themselves. His sad death proves the fallacy of his principal theories upon the subject. About six weeks ago he received a sick dog for treatment, and in an attempt to administer his favourite remedy to the animal—salt—was bitten upon the thumb; the wound was slight, and soon forgotten. On the the day preceding his death, when in the act of placing a cup of tea to his lips, he was seized with dreadful spasms, which, with intervals of calmness, increased in intensity. He rushed about his house, he barked like a dog, while streams of foaming saliva spurted from his mouth across the apartment, propelled as if with the force of an engine. It required the efforts of several strong men to hold him. He was attended by skilful physicians, whom he implored to take his life and release him from agony. Every effort was made for his relief, but neither by the stomach nor the hypodermic method was it possible to apply medication. During the last hours Dr. Lorette succeeded in forming a blister on his breast with mustard, and on this abraded surface of the skin he dusted sulphate of morphine. In ten minutes the drug acted on the patient's system, the opium delirium came on, and he died without further suffering, exclaiming towards the last, 'Oh! I am in heaven!'"

YORKSHIRE VETERINARY MEDICAL SOCIETY.

The usual Summer Meeting of this Society was held at the Queen's Hotel, Leeds, on Friday, the 31st July, the President (Mr. Broughton) in the Chair. The following members were present, viz.—Messrs. Naylor, Jas. Freeman, Anderton, Cuthbert, Carter, Patterson, Fallding, and the Secretary. Messrs. R. M. Murdoch, Ellis, and Ragg attended as visitors.

The minutes of the last meeting were read and confirmed.

Messrs. R. M. Murdoch and P. Ellis were nominated as members.

The President read a letter which he had received from Professor Tuson, regretting that he was prevented by indisposition from carrying out his intention of giving a lecture to the members at this meeting, and expressing a hope that he should be able to fulfil his promise at the October meeting of the Society.

Mr. Cuthbert narrated the details of a case of rabies in a young horse which had recently occurred in his practice. The horse was the property of Mr. Rickards, surgeon, Leeds, and had been sent to a breaker's establishment to be broken in for harness. The breaker noticing the horse to be wild, and very peculiar in his manner, requested Mr. P. Ellis to examine him, which he did, and not suspecting the true cause of the symptoms, prescribed powerful sedative medicines, but without affording any relief.

The owner being apprised of the horse's illness, requested his regular veterinary surgeon, Mr. Cuthbert, to see the animal in conjunction with Mr. Ellis. The symptoms now present were an exceedingly excitable state of the whole system. The horse was pawing and kicking violently from time to time; tearing and biting his own flesh, particularly the near foreleg, and biting and crunching the woodwork of the box. The pulse was very quick and small, and visible mucous membranes highly injected; frequent attempts were likewise made to urinate. The animal would also suddenly drop down when an attempt was made to approach him, or to elevate his head. He was also almost continually rubbing his head against the manger, walls, &c., of the building.

It was ascertained that a month previously the horse had been in a stable with a rabid dog, which was seen at the time by Mr. Cuthbert and ordered to be immediately destroyed. The horse lived three days after the first appearance of the malady.

Post-mortem appearances. — Lungs congested; abdominal viscera healthy; brain generally congested, and the membranes

highly reddened. In the space between the cerebrum and cerebellum a coagula of blood, produced by rupture of the vessels, was found.

In the discussion that followed most of the members narrated their experience of the symptoms and *post-mortem* appearances of the malady, and all agreed that as regards treatment no medicines had been found to be of the slightest avail in mitigating the symptoms.

JOHN H. FERGUSON, *Hon. Sec.*

THE SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

THE Quarterly Meeting was held in the Ship Hotel, East Register Street, Edinburgh, on Wednesday, 2nd June, at 2 o'clock. Professor Williams, President, in the Chair.

Present—Messrs. Baird, Bathwick, Aitken, Brown, Cumming, Black, Young, Balfour, and the Secretary.

Messrs. Mitchell (Bathgate) and Johnston (Roston) were also present as visitors.

Mr. W. Balfour, jun., was elected a member of the Association.

Mr. Baird described a case in which extensive ulceration of the mucous membrane of the mouth followed an attack of influenza. The ulcers were of a dark, almost black, colour, exposing, when scratched, a bright red surface. From the difficulty the horse had in swallowing, the back part of the mouth and pharynx were apparently also involved. The animal had been ill nearly two months, and as yet showed but little improvement.

Mr. Black, of Howgate, read an essay on "Parturition." In the course of his remarks Mr. Black touched on gestation, abortion, stricture of the os uteri, the symptoms of approaching parturition, the various forms of unnatural presentation, and concluded a very interesting paper by referring to the occasional sequels of parturition, simple milk fever, parturient peritonitis, apoplexy, and paralysis, also metritis and eversion of the uterus.

As a preventive of abortion, Mr. Black thought that cows which had recently calved should not be turned out at the same time as those soon expected to do so, and that the latter should not be allowed to come into contact with others which have just aborted; also, that in the spring, in the case of a considerable number of animals aborting, some person should be left in charge

of the cows when turned out, to prevent their running or being excited from dogs or other causes, and to check any cross-tempered one inclined to thrust at its neighbours. Mr. Black also gave details of three cases of stricture of the os uteri, and considered that it occasionally, though rarely, required to be operated on.

In unnatural presentations he had found the practical hints given by the late Professor Strangeways to his students very useful. 1. Have the mothers standing if possible; if not, have them laid on their right side. 2. After delivery, never leave until by exploration you have ascertained that there is not another fœtus. 3. In twin-labour beware of trying to bring away two at once. 4. Attach cords to all protruding parts. 5. Be cool and collected, and never leave the case for another to come after you.

Simple milk fever Mr. Black considered to be due to the establishment of lactation. Puerperal peritonitis he had seldom seen later than a week after calving.

Professor Williams said that in cases of stricture of the os uteri he had found belladonna to have a very good effect. He was also of opinion that in far the greater number of cases of parturition too much force was used to extract the fœtus; and that after getting the foal or calf into a position in which delivery was possible, instead of putting two or three, or four or five fellows to pull with all their might and main, it would be better to make the mother comfortable, and wait, when in all probability, unless she was utterly exhausted, the parts would relax, and parturition take place more naturally, and with much better results. Medical men did not use force with their patients, and he (Professor Williams) thought it would be well were veterinary surgeons to follow their example.

Other members, while agreeing with these views, considered that there might be some difficulty occasionally in carrying them out in practice, believing also that injury to the mother is more frequently done in the efforts to put the fœtus right, or in pulling it away when in some unnatural position, than in the mere employment of force when everything was ready for delivery. They could not, however, but think that there was much truth in what Professor Williams had stated, which it would be well to take into consideration and, whenever practicable, adopt.

Votes of thanks were accorded to Mr. Black and the Chairman.

Mr. Young kindly consented to bring forward a paper at next meeting.

C. Cunningham,
Hon. Sec.

ROYAL COLLEGE OF VETERINARY SURGEONS.

COLLEGE FUND.

In order to draw the attention of the members of the veterinary profession to the fund now being raised for building or purchasing suitable premises for the offices of the College, a circular has been recently issued to the members of the profession by the desire of "the President, Vice-Presidents, and Council of the Royal College of Veterinary Surgeons, urgently appealing to the members and friends of the veterinary profession for funds to enable them to complete the establishment of the College in providing a permanent habitation adapted for the meetings of its members—the examination of candidates for diploma—the extension of the museum and library, as well as affording facilities for the promotion of veterinary science generally.

"The Council beg most respectfully to call attention to the following list of subscribers, and earnestly hope that their appeal will not remain unanswered by the large number of practitioners in the United Kingdom of Great Britain and Ireland who have already obtained a professional status by the provisions of the Charter, and are likely to secure further results by its general application."

"Subscriptions may be sent to the Secretary (Mr. Wm. Henry Coates), either by Post Office orders made payable at the District Post Office, High Holborn, or by cheques crossed 'Sir Samuel Scott, Bart., & Company, London.' An official receipt will be forwarded in return."

The following List of Subscribers to the Fund for Building or purchasing suitable premises for the offices of the College is complete to the present date, September 30th, 1874.

	£	*s.*	*d.*
Donation originally given by T. W. Mayer, Esq., in 1849	37	14	7
Interest thereon	27	2	6
Adlard, J. E., Esq., London	1	1	0
Arnold & Sons, Messrs., West Smithfield	5	5	0
Axe, J. W., Assist.-Professor, R.V.C., London	2	2	0
Axe, Joseph Machin, Esq., Doncaster	1	1	0
Balls, Messrs. G., and Son, Brixton	21	0	0
Barford, John Davis, Esq., Southampton	2	2	0
Barker, William, Esq., Middlesborough	2	0	0
Batt, Hartley Thos., Esq., London	10	0	0

	£	s.	d.
Bentley, William, Esq., Margate	1	1	0
Bland, Wm. Colley, Esq., Newbury, Berks	5	0	0
Broad, James C., Esq., London	10	0	0
Broad, Alfred, Esq., St. John's Wood, London	2	2	0
Broughton, William, Esq., Leeds	2	2	0
Brown, G. T., Professor, R.V.C., London	20	0	0
Brown, John, Esq., London	2	2	0
Burgess, Willows & Francis Messrs., London	5	5	0
Burrell, Messrs. T., and Son, London	10	10	0
Burt, Messrs. W. and W., Brighton	5	0	0
Carless, Messrs. J., and Son, Stafford	2	0	0
Carter, Joseph Shepherd, Esq., Bradford	2	2	0
Cartledge, B., Esq., Sheffield	21	0	0
Cartwright and Hill, Messrs., Wolverhampton	50	0	0
Case, Edward, Esq., Fakenham, Norfolk	1	1	0
Cave, George, Esq., Liverpool	5	5	0
Cheesman, John Jas., Wandsworth	5	0	0
Child, James, Esq., Hackney	5	0	0
Clark, William, Esq., Islington.	3	3	0
Coates, Mr. W. H., London	5	0	0
Coe, Joseph, Esq., Stoke-upon-Trent	2	2	0
Coleman, Edward, Esq., London	2	2	0
Collings, John Jas., Esq., Plymouth	2	2	0
Collins, Jas., Esq., Staff V.S., Dublin	5	5	0
Constant, S. P., Esq., 5th Dragoon Guards, Dundalk	5	5	0
Cooper, William, Esq., Berkhampstead	5	5	0
Cope, Alexander C., Esq., London	5	5	0
Cox, John Roalfe, Esq., London	10	0	0
Crowe, W. A., Esq., London	1	1	0
Cuthbert, John, Esq., Leeds	2	2	0
Death, William, Esq., Army Service Corps, Aldershot	1	1	0
Dray, E. C., Esq., Wandsworth	5	0	0
Farrow, Wm. Hastings, Esq., London	5	0	0
Field, William, Esq., London	100	0	0
Field, William, Esq., jun., London	100	0	0
Fitzwygram, Col. Sir F. W., Bart., London	210	0	0
Fleming, G., Esq., Royal Engineers, Chatham	5	5	0
Freeman, James, Esq., Hull	1	10	0
Freeman, John, Esq., Hull	1	10	0
Freeman, Joseph, Esq., Keyingham, Hull	1	10	0
Gill, Samuel, Esq., Hastings	1	1	0
Goodall, Henry John, Esq., Melton Mowbray	1	1	0
Gould, George Jas., Esq., Southampton	2	2	0

	£	s.	d.
Gowing, Messrs. T. W., and Son, London	10	0	0
Greaves, Thomas, Esq., Manchester	20	0	0
Gregory, John B., Esq., Portsmouth	2	12	6
Hammond, John, Esq., Bale, Norfolk	1	1	0
Harpley, M. J., Esq., Anonymous	5	5	0
Harpley, M. J., Esq., Royal Horse Guards	5	5	0
Harwood, Thomas, Esq., Liverpool	2	2	0
Howard, Richard, Esq., Thetford, Norfolk	1	1	0
Hunt and Parker, Messrs., Birmingham	50	0	0
Jarvis, Frederick, Esq., London	10	10	0
Kennedy, Thomas, Esq., Wrexham	1	0	0
Kent, W. H., Esq., London	5	5	0
King, John Thos., Esq., Bournemouth, Hants	1	1	0
Lambert, John, Esq., 17th Lancers, Dublin	2	0	0
Lawson, Alexander, Esq., Manchester	5	5	0
Lepper, Messrs. H. and G. A., Son, Aylesbury	10	10	0
Longman, Geo., Esq., Cavalry Depôt, Canterbury	2	2	0
Lowe, Clement, Esq., London	2	2	0
Malcolm, John, Esq., Enniscorthy	2	2	0
Martin, John Bean, Esq., Rochester	2	0	0
Mavor, William, Esq., St. Leonard's-on-Sea	10	0	0
Mavor, Messrs. Alexander and F. J., London	50	0	0
Merrick, Thos. Jas., Esq., Northampton	5	5	0
Moon, James, Esq., Kingston-on-Thames	5	0	0
Moore, James, Esq., London	5	0	0
Moss, Michael, Esq., Sittingbourne, Kent	1	1	0
Naylor, M. E., Esq., Wakefield	10	0	0
Nettleship, Edward, Esq., London	2	2	0
Olver, Harry, Esq., Tamworth	1	1	0
Olver, Thomas, Esq., Truro	1	1	0
Overed, J. D., Esq., Blofield, Norfolk	2	2	0
Owles, Alfred J., Esq., Staff V.S., Aldershot	1	1	0
Paton, Thomas, Esq., Army Service Corps, Dublin	1	1	0
Pearce, J. H., Esq., Whitchurch, Hants	1	0	0
Peele, Henry, Esq., West Hartlepool	2	2	0
Price, Thomas S., Kennington Cross	2	2	0
Prudames, Alfred, Esq., Great Berkhampstead	2	2	0
Ritchie, James, Esq., Gateside, Kincaldrum	5	0	0
Robertson, William, Esq., Kelso, Roxburghshire	3	3	0
Roots, William, Esq., London	2	2	0
Simonds, J. B., Professor, Principal R.V.C., London	30	0	0
Smith, William, Esq., Norwich	5	0	0
South, George, Esq., London	5	5	0
Stanley, Edward, Esq., Warwick	5	0	0

	£	s.	d.
Stanley, Thomas, Esq., Edmonton	5	0	0
Taylor, James, Esq., Colchester	3	3	0
Thomson, George, Esq., Horncastle	1	1	0
Walker, Alfred, Esq., Rugby	5	0	0
Wallis, W. S., Esq., Halstead	2	2	0
Wells, Thomas, Esq., Beacondale, Norwich	1	1	0
West of England Veterinary Medical Society	20	0	0
Withers, Samuel Hicks, Esq., London	5	0	0
Withers, Henry, Esq., London	1	0	0
Withers, Alfred, Esq., London	1	0	0
Woodger, Joseph, Esq., London	10	10	0
Woodger, Joseph, Esq., jun.	10	0	0
Yorkshire Veterinary Medical Society	50	0	0

A gentleman has offered to give £100 towards the fund, on condition that nine other members of the profession will subscribe not less than £100 each. Or the same gentleman will give £50 provided that nineteen others will subscribe a sum of not less than £50 each for the same purpose.

APPOINTMENT OF PORT INSPECTORS.

We have the satisfaction of stating that the Government has selected the following gentlemen from the list of candidates, returned as having passed the required examination, as Inspectors, at the following ports where Irish Cattle are landed:

Mr. Samuel Durham	Greenock.
,, Adolphe Harrison Thomas	Liverpool.
,, Alfred George Leary	Liverpool.
,, Richard Alfred Turnbull	Bristol.

We understand that these appointments as to the port at which the Inspector will continue to act are subject to change.

APPOINTMENT OF A VETERINARY SURGEON TO THE COLONIAL GOVERNMENT AT NATAL.

It affords us much pleasure to announce that Mr. Samuel Wiltshire, late Assistant-Hospital Surgeon at the Royal Veterinary College, has been appointed by the Government to the office of Colonial Veterinary Surgeon and Inspector of Cattle at the Port of Natal.

Among other affections of a dangerous nature among its cattle, the Colony suffers heavy losses from a disease locally known as "red water;" an investigation of the pathology of which Mr. Wiltshire will have to give immediate attention to on his arrival.

PARTURIENT APOPLEXY IN THE MARE.

With reference to Professor Walley's communication on "Parturient Apoplexy in the Mare," published in our last number, in reply to Mr. Gerrard, we have been requested by Mr. Walley to insert the following corrected text of his observations:—

3rd paragraph.—Has Mr. Gerrard taken the trouble to inject and dissect the heads of many cattle with the view of inquiring into the arrangement of the encephalic circulation? if so, and he has found an exception to the arrangement of the vessels as described by me, I can only say that the exception proves the rule.

4th paragraph.—Is there not an equally (and in the mare a considerably more) rapid severance of the materno-fœtal vessels, at parturition, in other animals as there is in the cow?

OBITUARY.

We have to record the following deaths:—

Mr. William Dorrofield, M.R.C.V.S., of Rickmansworth, Herts. His diploma bears date May 11th, 1853.

Mr. Alfred Watson, M.R.C.V.S., of Tiverton, Devon. His diploma bears date May 17th, 1854.

Mr. George Godwin, M.R.C.V.S., of Thornbury, Gloucester. His diploma bears date April 26th, 1838.

Mr. John Hughes, M.R.C.V.S., of Middleton, Co. Armagh. His diploma bears date April 30th, 1862.

Mr. Richard Ricketts, M.R.C.V.S., late of Highworth, Wilts. His diploma bears date May 22nd, 1850.

Also Mr. John Rushton, M.R.C.V.S., of Dudley, Worcester. His diploma bears date July 12th, 1830.

THE

VETERINARIAN.

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Communications and Cases.

OPENING OF THE SESSION AT THE ROYAL VETERINARY COLLEGE.

The Winter Session at the Royal Veterinary College was commenced on October 1st. Mr. Newdegate, M.P., one of the Vice-Presidents of the College, occupied the chair.

The theatre was well filled with a large class of students and their friends, and among the visitors were many members of the medical and veterinary professions. The Council and Court of Examiners of the Royal College of Veterinary Surgeons were represented by the President, Secretary, and several members of the Court.

Professor Tuson delivered the following

INAUGURAL ADDRESS.

Mr. Chairman and Gentlemen,—Having been deputed by my colleagues to deliver the address which is to inaugurate the session 1874-5, permit me to state that I do not intend dealing with veterinary politics or discussing debateable points in science, but that I shall endeavour to confine myself strictly to what I conceive to be the duty entrusted to me, namely, to offer some general information and advice respecting the curriculum to those who, by passing the recent matriculation examination, have become enrolled as freshmen or new pupils of the College.

I cannot, however, proceed to the accomplishment of my task without first expressing the extreme pride and gratification I feel at the chair being occupied on the present occasion by Mr. Newdegate, Vice-President, and one of the oldest governors of the institution. From his occupying these positions he is naturally entitled to our highest respect; but when I inform you that no one has worked harder for the welfare of the college, that I believe no one takes a deeper interest in the advancement of the veterinary profession, and that he invariably displays the greatest possible courtesy and kindness, I feel well assured that you will all heartily unite with me in tendering to this gentleman our warmest thanks for the honour he has conferred upon us by presiding over our meeting to-day.

The veterinary profession, gentlemen, is of great public utility and importance, not only because our comfort and convenience frequently depend upon the maintenance of the health of the horse, but also, and chiefly, because the health and sustenance of our very selves are intimately associated with the prevention of disease among, as well as the devising and carrying out of hygienic regulations in relation to, the flocks and herds upon which we depend for our daily feod. Veterinary studies and practice likewise arouse into activity, in every properly constituted mind, many of the noblest attributes of man, and they require for their full development and success the manifestation of the highest intelligence.

Under these circumstances, and bearing in mind that at no previous period in the history of your profession has the public been so ready to engage the services of the veterinary surgeon, that never were there so many public appointments, both at home and abroad, open to you, that never were there such facilities for the student obtaining a sound practical and theoretical knowledge of his pursuit, and that never were there such opportunities for the attainment of a good social position, I say, gentlemen, that, under these circumstances, I feel I can conscientiously congratulate you on your having selected the veterinary profession as the pursuit of your lives. And although it may not enable you to become wealthy, it will nevertheless afford you the means of rendering valuable assistance to your fellow men, of alleviating the sufferings of the lower animals, and of gaining at least an honorable and comfortable position in the world.

The first essential to success, during your pupilage, and likewise in after life, is the possession of a substantial general education, for by its means only can you fully comprehend

and profit by the teachings of your text-books and professors. Moreover, a good general education is the lever which is elevating, and which is yet to raise still higher, the veterinarian in public estimation. If you watch, as I have watched, the careers of the followers of human medicine, you will find, in most instances, that those who have risen to the greatest eminence, either as practitioners, investigators, or writers, have previously undergone that thorough mental training in classics and mathematics which is provided by the arts courses at the universities. Preliminary education supplies the tools which not merely enable you to easily and rapidly master your professional work, but it also qualifies you for the investigation of the unexplored regions of science, and confers upon you the power of extending her boundaries. There are many men of great natural ability who are deterred from prosecuting original inquiries, or from publishing their views and results, simply on account of their deficient education; in other words, from their lacking that confidence and power which a good education can alone impart to them. I would, therefore, earnestly advise those of you who possess but sufficient scholastic knowledge to pass our matriculation examination not to rest contented with such acquirement, but to devote yourself seriously during the earlier portion of your career as practitioners, when, in all probability, you will not be overburdened with patients, to the obtainment of a far higher standard than the authorities of this college impose upon you. For education "is a companion which no misfortune can depress, no clime destroy, no enemy alienate, no despotism enslave; at home a friend, abroad an introduction; in solitude a solace, in society an ornament; it chastens vice, it guides virtue, it gives at once a grace and government to genius."

Recollect, however, that "every man has two educations —that which is given to him, the other that which he gives to himself. Of the two kinds, the latter is by far the most valuable. Indeed, all that is most worthy in a man, he must work out and conquer for himself. It is this that constitutes our real and best nourishment. What we are merely taught seldom nourishes the mind like that which we teach ourselves."

For the obtainment of the diploma, which alone can give you the right to the title of veterinary surgeon, you will have to pass two examinations:

The first in Anatomy, Histology, Chemistry (general and practical), Pharmacy, Materia Medica, Therapeutics, and Botany.

The second in Physiology, Pathology, Morbid Anatomy, and Veterinary Medicine and Surgery.

This list will doubtless appear a very formidable one to many of you. But remember that the course has been framed by the ablest and most experienced members of the profession to which you aspire to belong, and that a thorough knowledge of every one of these subjects is essential to the obtainment of a mastery over your art. Therefore do not commit the serious mistake that some of your predecessors have made, of paying attention only to those subjects which *you* may consider necessary; if you do, you will certainly fail to get your diplomas, and you will consequently be punished by defeat and disappointment.

Although each professor will doubtless point out to you the importance, best mode of learning, and the applications of that department of science which he is entrusted to teach, I shall take the opportunity which the present occasion affords me of briefly explaining the nature of the principal subjects of the curriculum, and of making such remarks thereon as I hope may be of service to you.

Firstly, then, you must acquire an intimate acquaintance with the shapes and relative positions of the different organs, as well as of the various bones, muscles, nerves, blood-vessels, and other tissues of the bodies of domesticated animals; in other words, it is imperative that you become sound anatomists. Unless you do so you can never confidently recognise, or undertake the treatment of, the medical and surgical maladies of your patients.

The opportunities which will be afforded you of gaining a knowledge of anatomy are manifold; for, in addition to the lectures of Professor Pritchard and Assistant-Professor Axe, you will be required to attend the demonstrations of the latter gentleman, and, above all, you will have the advantage of dissecting for yourselves under the immediate superintendence of the demonstrator.

In learning anatomy you are not required to rack your brains with theories or speculations; all that is necessary are patience, diligence, good eyesight, and a retentive memory. You need take nothing for granted, you can see and examine everything for yourselves; consequently there is no impediment, unless you labour under the disadvantage of possessing an atrociously bad memory, to your becoming perfect anatomists. This you must most certainly strive to do, and when not otherwise engaged during college hours it is expected that you will be found in the dissecting-room.

There is a branch of anatomy which is termed histology.

For the prosecution of this study the aid of the microscope is brought into requisition, as it is specially concerned in investigating the appearances of structures that are too minute to be recognised or clearly defined by the naked eye. In health the tissues present one set of microscopic characters, while in disease these characters disappear altogether or undergo well-marked modifications. Histology therefore renders important service to the medical man by enabling him in many instances to arrive at a positive conclusion respecting the nature of a disease, and to form a judgment as to whether or not the malady is curable.

The subject next in importance to anatomy, and which, in conjunction with it, forms the only sound basis of true medical knowledge, is chemistry. This science, besides informing us of the composition of the tissues of the body and of the substances used as medicines, is necessary to the proper understanding and rational application of Pharmacy, Physiology, Materia Medica, Toxicology, and the other branches of medical knowledge.

As examples of the value of chemistry to the veterinary surgeon I may cite the following:

It is well known that hard waters, that is, waters which form a curd instead of a lather with soap, frequently injure the digestive organs of animals, occasion colic, and, in the horse, produce a staring coat. Now, chemistry is the only science which is competent to tell us that this quality of hardness is due to the presence of dissolved earthy matters, and that the ill-effects arising from the drinking of the waters here referred to are caused by the bicarbonates of lime and magnesia. It is chemistry also which furnishes us with a simple means of ascertaining the extent of the hardness, and which supplies us with an equally simple process for diminishing or removing the evil. That information of this kind is of substantial value to you is proved by the fact that former pupils of mine have, in several instances, clearly traced disturbed digestive function to the drinking of hard water, and especially by the circumstance that these gentlemen have softened the waters by the process to which I have just alluded, and their patients rapidly regained their normal health and vigour.

One of the most valuable and commonly employed medicines is calomel. But it sometimes happens that the administration of alterative or cholagogue doses of this agent is followed, much to the astonishment and contrary to the intention of the prescriber, by violent purgation and other alarming symptoms. Here again it is chemistry which

explains the mystery, by telling us that calomel, owing to ignorance or carelessness on the part of the manufacturer, is occasionally mixed with corrosive sublimate, a powerfully irritant poison, and that the untoward purgative effects of which I have just spoken are occasioned by this deadly contamination. Chemical knowledge furthermore tells us that the poisonous activity of corrosive sublimate may be combated by the administration of white of egg.

In the diagnosis or recognition, as well as in the prognosis or prediction respecting the termination of certain diseases, a practical acquaintance with chemistry is most essential, as I think the following example will demonstrate.

Let us suppose that, as is frequently the case, the medical man is uncertain respecting the nature of the malady from which his patient is suffering, but that he suspects the affection to be one of those which is accompanied by an altered or abnormal state of the urine. To satisfy himself on this point he will, if properly trained to his profession, apply certain tests to the secretion. We will next suppose that he discovers albumen.

Now, this substance is not a constituent of healthy urine, so that its presence is indicative of morbid function. In many acute febrile affectious albumen is frequently present, but usually disappears as the patient gets better. Should, however, a daily analysis of the urine show no diminution in the amount of albumen, and especially if, by the microscope, what are termed renal casts are discovered, then you may be sure that the kidneys are organically diseased. From information obtained in this manner, added to that gained by a careful observation of symptoms, you not only gather a perfect and complete knowledge of the disease you are investigating, but you are placed under the most favorable circumstances for devising the best method of treatment.

As in every other department so in chemistry; ample provision is made for your learning the leading principles and facts of the science by attendance on lectures, also for your receiving practical instruction in analysis, the detection of impurities in medicines, the determination of the quality of, and the discovery of adulteration in, foods, the examination of water, milk, urine, and blood, as well as the identification and detection of poisons.

It may appear egotistical on my part, as the professor appointed to instruct you in the science we have just been considering, for me to give utterance to the statement that there are many able young men who have diligently attended

the theoretical and practical instruction in chemistry provided by this college, who are much better qualified to fill the post of public analyst than are many of the persons actually appointed to protect the public from fraud by adulteration. This statement is one of fact nevertheless. From what I have just said do not for a moment imagine that it is the intention of the authorities, or my object, to make you profound or professional chemists. On the contrary, it is, I assure you, my constant aim and care to specially instruct you in those branches of my overgrown science which have a direct bearing on medicine and the laws of health, to implant in you a love of knowledge for its own sake, and to guide you to those sources of exceptional information which in cases of emergency may be often resorted to with the greatest advantage by every practitioner of the healing art.

Hitherto instruction in pharmacy, which comprises the preparation and mixing or dispensing of medicines, has not received that amount of attention on the part of our pupils which this branch of your art is entitled to. For the future, however, you will receive instruction in this subject under the able superintendence of Professor Brown in the new laboratory specially constructed and arranged for the purpose.

In reference to toxicology, which includes a knowledge of the action of poisons on the system, of the methods of identifying and detecting them, and of their appropriate antidotes, I feel certain that I need but state that, during the fourteen years which I have held my present appointment, about 500 cases of actual or supposed cases of poisoning of the lower animals have been submitted to me from various parts of the kingdom for investigation, to prove to you the importance of your paying diligent attention to the lectures and practical tuition available to you on this essential branch of your professional education.

Although the introduction of botany into the curriculum had long been advocated, it only became incorporated into the system of veterinary education about three years ago. An experience of many years gathered in several of the schools of human medicine enables me to know that the already over-worked students at such institutions do not, as a rule, receive instruction in this most interesting branch of natural science with any great degree of pleasure. Doubtless the reason, which I think is a perfectly sound one, for this failure of appreciation lies in the fact that the intending surgeon or physician fails to recognise any direct application of botanical knowledge to the practice of his profession.

Your position in relation to this science is a totally different one, for many of the animals which constitute your patients are pastured in meadows which sometimes abound with plants possessing the most noxious properties, and as outbreaks of disease, and even death, are every now and again caused by these poisonous vegetables, it will, I am sure, be evident to every one of you that a knowledge of structural, and especially of field botany must not be looked upon as a mere accomplishment, but that it should be regarded as an essential to every veterinarian, and especially to those practising in country districts. Here again you will not be permitted to trust simply to a book-knowledge of your subject, but you will also attend the valuable lectures of Professor Cobbold. You will likewise accompany this gentleman on his field excursions, which, from personal experience, I know to be fraught with interest, intellectual amusement, and practical utility.

Having indicated, although imperfectly, the nature of the subjects to which your attention will be directed during your first winter and summer sessions, I refrain from wearying you with a description of those required for the second examination for diploma, especially as they will be fully explained to you in due time by my colleagues who teach them, and who are consequently far more competent than I to perform this office.

I may be permitted, nevertheless, to tell you that success in passing either of the examinations, no matter whether they are instituted by the authorities of this institution or by those of the Royal College of Veterinary Surgeons, is only to be attained by unremitting patience and industry, and a determination to conquer all difficulties. To this advice I may add that the professors, acting under authority vested in them by the governors, insist upon your regular attendance in every department of your studies, require you to be orderly in your conduct while within the college walls, and hope that when beyond the bounds of the institution, you will do nothing to tarnish the good name of the profession to which you are attached.

It is most gratifying, and at the same time only fair, to state that manifestations of ill-behaviour on the part of our students are extremely rare, and I am delighted to bear testimony to the fact that at no medical school with which I have been connected have the pupils been more orderly or more attentive to their duties than those at the Royal Veterinary College.

As regards the professors, I can assure you that neither of

us considers his duty towards the class terminates with the delivery of a lecture, and that it is at all times a very great pleasure to us to answer questions, clear away difficulties, and contribute to your advancement in any way within our power.

In the brief outline which I have attempted to give you of your duties you must have observed that the task set before you is no light one, and that in qualifying for the diploma of the body corporate you will necessarily acquire a considerable amount of knowledge of many sciences.

Beware, however, of remaining satisfied with the information gained during your studentship, and think not that you have nothing more to learn. All the knowledge that you can possibly glean from private study and the instruction of of your teachers is but sufficient to fit you for commencing your careers ; lengthy experience, added to the retention and application of your scientific acquirements, can alone make you the reliable and accomplished practitioners your profes sors so heartily desire to see you.

Before I retire you must allow me to draw your attention to the numerous and important alterations which have been effected since I became an officer of the college, that is to say, within the last fourteen years. During this period have been built the commodious theatre in which we are now assembled, a museum, an operating theatre, a dissecting room, a post-mortem house, three laboratories, one for chemistry, one for physiology and histology, and one for pharmacy, admirably arranged stables, giving us accommodation for a hundred horses, sheds for cattle, loose boxes especially adapted for the reception of accidents, Turkish, vapour, and every other kind of bath needful for the treatment of our patients, and last, though not least, a well-appointed dog infirmary.

Add to this goodly list of improvements the simplifying of the acquirement of the student's knowledge by rendering it progressive and reducing the curriculum from chaos to order, the introduction of the matriculation examination, the division of the pupils into two classes, and the establishment of two additional professorships, you will then agree with me in considering that neither the subscribers, the professors, nor yourselves can withhold their highest admiration from our estimable governors, whose constant care is devoted to the perfection of the institution over which they so ably preside.

In conclusion, let me exhort you to shun gambling of every description, and to avoid the society of the inebriate and

disreputable: emulate the thorough horseman, but be not horsey; finally, to shape your conduct through life that the world may say of each of you,

> "He is a noble gentleman; withal
> Happy in his endeavours; the general voice
> Sounds him for courtesy, behaviour, language,
> And every fair demeanour an example;
> Titles of honour add not to his worth,
> Who is himself an honour to his title."

At the conclusion of the address Mr. Newdegate presented the Coleman Prize Medals and Certificate to the successful Candidates, and also the Certificates which had been awarded to the Office-bearers of the previous session.

AWARDS.

Mr. Anthony Willows; Wareham, Norfolk.	The COLEMAN *Silver Medal.* Clinical Clerk, *Certificate.* Monitor ,, Prosector ,,
— John Reynolds; London	The COLEMAN *Bronze Medal.*
— Frederick William Hanks; Hackney.	The COLEMAN *Certificate of Merit.* Assistant-Inspector at the Annual Meeting of the Smithfield Club, *Certificate.* Clinical Clerk, *Certificate.* Monitor, ,, Prosector, ,,
— Adam Cuppage Webb; Norwich.	Assistant-Inspector at the Annual Meeting of the Smithfield Club, *Certificate.* Monitor, *Certificate.* Prosector. ,,
— Thomas Stainton; Horncastle.	Assistant-Inspector at the Hull Meeting of the Royal Agricultural Society, *Certificate.* Clinical Clerk, *Certificate.* Prosector, ,,
— William Penhale; Barnstaple.	Clinical Clerk, *Certificate.* Monitor, ,, Prosector, ,,
— William Haste Kennedy; Wrexham.	Clinical Clerk, ,, Monitor, ,, Prosector, ,,

Mr. Robert Ruddle Cole; Hinkley.	Clinical Clerk,	*Certificate.*
	Prosector	,,
— James Cleveland; Brampton, Suffolk.	Clinical Clerk,	,,
	Prosector,	,,
— William Penhale; Holsworthy, Devon.	Clinical Clerk,	,,
	Prosector,	,,
— James East; Aylesbury	Clinical Clerk,	,,
	Prosector,	,,
— John Dixon Bremner; Valentia, Co. Kerry.	Monitor,	,,
— Richard Frederick Shillingford; London.	Clinical Clerk,	,,
— Nevill Bruce; London .	,,	,,
— Herbert Nixon; Sheffield	,,	,,
— John Dibben; Derby .	,,	,,
— James Standon; London	,,	,,
— William Ratcliffe Bryan; Loughborough.	,,	,,
— Thomas James Robert Endle; Plymouth.	,,	,,
— Adolph Harrison Thomas; York.	,,	,,

At the close of the distribution the Chairman addressed the meeting as follows:

It would be unnatural, Mr. Principal and Gentlemen, when I have been deputed by my brother governors to take the chair at the opening of the session, and the distribution of prizes, if I, who have now been for more than thirty years an active member of the governing body of this Institution, should not venture upon addressing to you a very few observations.

I congratulate you, Mr. Principal, I congratulate the professors and officers of this Institution, upon the manifest progress which the old college of Camden Town has made (applause). I should be unjust to my brother governors if I were not to tell you that we have not been an inefficient body. I should not be worthy of being a vice-president were I not to assure you that His Royal Highness the Commander-in-Chief, following as President of this Institution in the footsteps of his illustrious father, has ever

borne in mind the interests of this college, believing that in this great school there has been the origin, as also the most powerful means of supporting the steady progress of the veterinary profession (applause). And I believe that we owe it to our President, that we of the governing body have the valuable assistance of Mr. Wilkinson as one of our number, a person eminent in his profession, and valued in the army, not only for his professional skill, but also for his personal qualities as a gentleman (applause). The governors some years ago rejoiced to find that Mr. Wilkinson would sanction their departure from the old rule, by which no professional man was eligible to the governing body by accepting our election of him to the position which he holds. And now, gentlemen, I must beg you to consider that whatever may fall from me on this occasion will be the observation of an *amicus curiæ*, so far as the executive authority and the professorial and teaching power of this college is concerned, which is so ably represented by your Principal (applause). Not only have I been an active governor for thirty years myself, but I am the lineal descendant of one of the founders of this institution. My grandfather was associated with the then Mr. Angerstein in the undertaking to found this college, and I believe that they were both induced to undertake that which has turned out to be so profitable a work for the public by friendship with and knowledge of the eminent Dr. Jenner. Well, perhaps, it may be useful to you, the younger members of the profession, to know why it is that for so many years it has been found advantageous to the profession that the governing body of this institution should be mainly non-professional. The reason is this, that this institution owes its origin to the public, and is supported by the public, and that we, the governors, and your President, represent the public, and represent the interests of the public as identified with your progress in knowledge, represent also the goodwill of the public, as manifested in the support that it has extended to this institution. But let me remind you that we represent also the tribunal before which the qualifications of every one of you, students, must in after-life be tested. We represent the great jury upon whose verdict your success in after-life will depend, for there is no profession which is so severely tested by the results as the veterinary profession. And it is still more to the credit and honour of those gentlemen who are engaged in it that they have succeeded in passing through so severe an ordeal. When this college was founded, some three quarters of a century

ago, nothing could be more lamentable than the deficiency of veterinary knowledge in this country. In three quarters of a century your profession has emerged from mere farrierism, and taken its place beside the medical profession of this country (applause). Seventy-five or eighty years is a short period in the life of a profession.

It is only thirty years since your existence as a profession was recognised by the conferring of a Royal Charter, and since that date no one who can compare the progress of veterinary science in this country with its progress abroad needs to be dissatisfied by the advance which has been made in all the branches of the science. Well, gentlemen, perhaps no one felt more indebted than I did to Professor Tuson for the able lecture with which he has opened this session, for I confess when as a layman I began to read the able essays which have so well deserved the prizes which have been allotted to Mr. Willows, Mr. Reynolds, and Mr. Hanks, I did feel most grievously the want of a dictionary. There were a succession of half latinised terms of art which made me feel the wide difference between professional knowledge and those general acquirements which, from the necessity of the case, must be found in every man who has taken an interest in the breeding and in the care of horses and other animals. But the truth is this, it is absolutely necessary, gentlemen, that you should become familiar with this language. Terms of art are necessary to the rapid development of science, as necessary to the rapid development and communication of science as is algebra to the furtherance and rapidity of the action of arithmetic. Terms of art rightly understood convey in a single word the meaning which, if developed in ordinary language, might fill pages. I therefore do not complain of these terms of art, though I may lament that I am not familiar with them. I feel that if I knew the full value of each of these words I should be able to stride from step to step like a giant through the intricacies of the science. But still I do feel, and feel most deeply, the value of such an exposition as Mr. Tuson has given, for there are some fifty-five freshmen here present who are just entering upon a task which, if I had time and opportunity that were not devoted to other labours, I should like to undertake myself (applause). Well, gentlemen, I am not only a member of the governing body of this institution, but I am also a member of the governing body of the great school at Rugby, and let me without presumption address to you one or two words upon the general subject of education. All real education is self-

education. In the ability of the professors of this college, in their scientific knowledge, in all the appliances that you see around you, you have aids, but a man's education must depend upon himself (applause.) Depend upon it that professors may attempt to teach you, but in each of you within yourselves is the capacity to learn. The student who is contented to learn like a parrot, or the idle lad who tries to substitute cramming for research, will find that he has been educating himself, not for eminence in such a profession as that upon which you desire to enter; he has not been educating himself to become a veterinary surgeon, but a quack (applause.)

Well, now, forgive my addressing to you another word or two. In your professional education, as in all education now, the branches of knowledge, and particularly of scientific knowledge, in which young men are expected to become proficient, are far more numerous than they were, and particularly in science. Beware how in this labyrinth you lose the clue. You will find, if you live to be as old as I am, that your education will not cease or cannot cease if you are to advance when you leave this college; it is only preparation for the education you will have to carry on. I took my degree and left Christ Church, Oxford, to enter Parliament at a very early age, and I have been striving to learn ever since I have been within its walls. So it must be with every man who means to keep himself abreast of the age in which he lives, especially an age of such rapid development as this, and I have felt the temptation myself when I have had to investigate deep subjects to loiter by the way. If you are to trace out for yourself some course that is to lead you up to a certain point in knowledge, all kinds of subjects will present themselves around you. The wisdom is this, to glance at them all that you may know the sight of each, and so if at some future time you should need information upon that point you may revert to it, but keep your object steadily in view and pursue your course. Never be satisfied until you feel within yourselves, to use a French term, that *aplomb*, that confidence, that at least you stand firm in your knowledge of the point that you have been seeking. Such is my experience. I rejoice to hear that in the number of candidates for admission there is no falling off, but progress. If you look around this Institution you must become conscious, by the great improvement which has taken place in the Infirmary arrangements and in the provision which has been made for practical instruction in every department of Veterinary Science, that the governing body have not been idle.

Indeed, it received a great stimulus in the official energy of your able principal (applause). We have improved the interior of our building, and at last we have determined to improve the complexion of the exterior; and I trust that we shall have relieved the material structure of our Alma Mater from the imputation of seeking to hide her wrinkles beneath her painted features by referring to the evidence within that she is still buxom and full of life (laughter and applause). I thank you, Mr. Principal and Gentlemen, for the attention with which you have been pleased to listen to these few observations, and will conclude by expressing a hope that the rapid progress—and it has been rapid—of this, the chief school in the British profession of veterinary science, may continue unabated for many years (applause).

Professor Simonds.—Gentlemen, a pleasing duty now devolves upon me, and one which I am quite sure you would deeply regret if it were not carried out to the letter; it is, that I ask your consent to a vote of thanks to our chairman for his very great kindness in presiding at this meeting, and for the very able and excellent address which he has delivered (applause). I might sit down after having made this proposition, and after its being so readily assented to, but I am reminded that there is one other circumstance to which I should direct your attention. Our able chairman has said that we are but a very young profession. That is exceedingly true, and he has also said that considerable advancement has been made since the profession became an incorporated body. We, however, on this occasion, I think, should look to some of the aids and helps which in fact originally supported and have since surrounded us. I am one of those, and I trust I ever shall be one, to acknowledge the deep debt of gratitude we owe to the sister profession of medicine (applause). She came to our aid in infancy, and it is to be remembered that we can number among those gentlemen who took the deepest interest in the success of this institution, and also lent their valuable services in sending into the country persons whom they believed to be in possession of scientific knowledge,—such men as the late John Hunter, the most eminent physiologist that perhaps the world has ever seen; the late Sir Astley Cooper, Sir Charles Bell, Sir Benjamin Brodie, John Abernethy, Henry Cline, Joseph Henry Green, and many others whose names do not immediately occur to me. But when these passed from off the scene others equally eminent took their place, determined to do all they possibly could to alleviate the sufferings of the lower

animals through the aid of veterinary science. And now we can boast of the co-operation of such men as Dr. Sharpey (applause), and others allied with him in the progress of science, who still give us their valuable assistance at the Court of Examiners. Why I especially allude to Dr. Sharpey is this, that we are honoured on this occasion with his presence (applause). For myself I venture to thank him, and I think I may say that I may thank him also in your names, every one of you (applause). It is many a day since Dr. Sharpey was seen within these walls, and I trust it will not be long before he will be seen here again. At any rate, he has identified himself with the onward movement of the day, and I do feel, as I have already expressed to you, a great debt of obligation to him for having kindly been with us on this occasion. It is not necessary, I think, that I should add to these remarks. We have had a very agreeable, and I trust also a profitable meeting.

To you, Mr. Chairman, I cannot find words to express our gratitude. From your earliest connection with this institution, you have always been found to be one of the most staunch friends it possessed (applause); you have always been ready and willing to take a leading part in any and every act which was calculated to advance the best interests of the profession of which it is the Alma Mater; and beyond that you have always met me—and I am quite sure I may say the same with regard to those who have gone before me—you have always met us with the kindest urbanity, you have seen us at any and at every time, whenever, indeed, we wanted any counsel or advice.

Gentlemen, I do not know that I can say more in praise of our very excellent chairman and vice-president than simply to announce a fact, which will show at once the deep interest Mr. Newdegate feels in our success, when I tell you that at half-past ten o'clock last night, on his arrival in town from his country residence, he called upon me to know how he could best promote the welfare and the onward progress of the college and its objects this day (applause).

The Chairman.—I beg, Mr. Principal and Gentlemen, to thank you most cordially for the kindness with which you have been pleased to receive me upon my first official appearance as a Vice-President in this chair. But, gentlemen, I must tell you that the Principal has overvalued the services that I have been able to render to you. Remember who have been my colleagues in the governing body of this institution, which has been under the presidency now for many years of successive members of the Royal Family, of two Com-

manders-in-Chief, the late Duke of York and the present Duke of Cambridge. You have had such governors as the late Lord Palmerston, you have had such governors as the late Lord Ossington, you have had such governors as the late Lord Zetland, and now you have such governors as the Duke of Portland, the Duke of Rutland, the Earl of Portsmouth, and Viscount Bridport; and besides these you have had the constant attention of the best of Chancellors of the Exchequer, your excellent Treasurer, Mr. Bosanquet. Thus the governing body of this institution has consisted of eminent and distinguished men at all times. And now I have mentioned Mr. Bosanquet, I may add that I know no governor who has given such continued attention to the interests of this College as has Mr. Bosanquet. It is he who has husbanded the funds, by the use of which, and I hope not the extravagant use, the governing body have been able to develope the institution up to its present condition of prosperity, and I should be ungrateful as one of his colleagues if I failed to pay this tribute to him in his absence, which I most deeply regret. Under such auspices this College ought to have succeeded; I have been a humble fellow-worker with such men. I would also thank Professor Sharpey for his presence here to-day. Nothing could be such an encouragement to us as the knowledge that the medical profession of this country has accepted the veterinary profession as a sister. There is something in the organization of this College which I have striven to preserve analogous to the constitution of the medical profession. The profession is governed by a republic of its own; free from all external interference, it brings its own public opinion to bear in regulating and in promoting the interests and character of its professors. So should it be, and so has it been with the veterinary profession of this country, and I believe that it is in the independence of the constitution of this College, copied from and emulating the independent government of the medical profession, that have laid the foundation of that success upon which I join with you in congratulating ourselves. I commend you all to the prosecution of your studies with a view not to your selfish interests, but with a view to becoming that which every good Englishman should be—a useful constituent in the community of our dear old England (applause.)

OBSERVATIONS ON PARASITES FROM THE HORSE AND FROM OTHER ANIMALS.

By Robert Spooner Hart, V.S., Calcutta.

(*Extracted by the Editors from Letters.*)

Since the publication of Mr. Hart's previous communication on parasites in the September number of this Journal we have received two additional papers on the subject of entozoa. In the first of these, dated from Calcutta in May last, Mr. Hart writes to Prof. Simonds as follows:

"Enclosed are a few fragmentary jottings on the subject of parasitism, referring chiefly to the nematoidea found between the coats of the stomach of the horse, with a description of their abode, &c. I have despatched per steamer "Sultan" a jar, which you may expect to receive about the end of June.

"The jar contains three nematoid abodes from between the coats of the stomach of the horse, and also the stomach, small intestines, and portions of the cæcum and colon of a horse which died in one of the Calcutta stables. In addition you will receive a small bottle containing a sample of the parasitical guests that inhabit these apartments, built between the walls of the stomach. You will find the worm abodes amidst the contents of the jar; they are tumour-like bodies, and are three in number. The largest of the three contained nothing but a quantity of yellow cheesy matter; the second is in an untouched condition, appearing as it was removed from the stomach, and contains parasitical colonists; the third appears in section, and shows the internal or pipe-like arrangement which I speak of in the lines enclosed. In watching the movements of the living parasites under the microscope I, if I err not, have detected a very interesting movement of the umbilicated or cup-like extremity of the worm, this extremity appearing to shorten and elongate alternately in a similar manner to the horn of the snail, receding within itself, like pushing the end of a finger glove within itself and then its extension again, but this may be due to difference of position as presented to view in the field. If you divide the body of one of the living parasites, and then examine the slide upon which this was done, you will have a field showing countless numbers of small elliptical bodies, which I suppose to be ova.

"I hope to place at your disposal very shortly six or seven varieties of worms, chiefly of the class Nematoidea, which I have found in the horse and other hosts, trusting some of them may prove of value and interest.

"With reference to the stomach, greater portions of the small intestines and of the cæcum and colon of the horse which I have stated died in one of the Calcutta stables, I regret to say that they have wonderfully altered in appearance since removed from the subject; but in spite of this you will experience no difficulty in recognising characteristic lesions. Should you desire it I will send the history of this case, but I have refrained from doing so now because I intend at a future period to publish my experience on tropical equine pyrexia.

In his second letter, dated from Calcutta in June, Mr. Spooner Hart writes as follows:

"I intimated in my letter of last week's mail that I intended forwarding the specimens of parasites which I have collected. I have done so, and the box containing them may be expected to arrive at the College about the end of July. If Dr. Cobbold will examine the specimens the result would probably be interesting; but should any of them not prove of value they can readily be disposed of.

"I had the misfortune last year to lose by accident twenty-two worms which I had removed during the past few months. I hope the few I have sent will enable you to settle the question as to whether one or two varieties of guests take up their residence in the anterior chamber of the eye of the horse. Partly from a want of time and interest in the subject I have not taken advantage of examining the many specimens which my practice has presented during the past five years. Some of the cases of worm in the eye when first submitted for examination exhibit this patent difference: firstly, the parasite may be seen in the form which those in the bottle display, with the exception, perhaps, of being somewhat smaller at first, but the worms grow rapidly to the full size you see them; secondly, other cases show with the moving guest developed in a white capsule or cocoon, shaped like a segment of a tapeworm, and as seen through the cornea; regarding size appearing of the same width, but somewhat longer than an ordinary tapeworm segment. This cocoon or white envelope drops off in flakes gradually, the moving band of matter or parasite in the mean time presenting a very irregular jagged outline, until at last the whole of the white capsule or cocoon is shed, and then the worm appears in the form presented by those before you. Whether or not

there be one or two worms I am not in a position to state, but shall be happy to give you any information respecting the subject."

Mr. Spooner Hart's second letter then closes with a "catalogue of parasites contained in the bottles, together with mention of their hosts, &c." To speak more correctly, the list simply furnishes a useful record of the various sources whence the several entozoa have been obtained, because only one of the species has had its combined generic and specific name appended. The specimens having been handed over to Dr. Cobbold for identification, we must refer those who desire further particulars to our colleague's *report*, which is given in another part of our present monthly issue. It only remains for us, therefore, to thank Mr. Hart very cordially for his several contributions and donations.

REPORT ON PARASITES FROM INDIA.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

Along with the communication on "Bursottee," dated from Poona, August 24th, which Mr. F. F. Collins has entrusted to my care, I have received a small number of entozoa. Respecting these worms, Mr. Collins observes:—

"I forward you by next mail three descriptions of parasites. One, you will perceive, is of a thread-like form, and was taken from a horse's stomach that was destroyed for old age; the other two were taken from the sinuses of a sheep's head. and appear, as far as I can judge, the larvæ of the *Œstrus ovis*, but from the black rings round one of them, of which there were many of a like description, I fancy they are different species of the same family. Will you kindly identify them?"

In reply, I have to remark, that the parasites in question are twenty-seven in number, fourteen of them being bots, and the remaining thirteen being threadworms. I have examined the bots microscopically, and find all the larger specimens to exhibit the form of head proper to the *Œstrus ovis;* the labium, mandibles and maxillæ answering perfectly to the accurate description originally given by Mr. Newport, who also describes and figures certain organs which he determined to be eyes. In the smaller specimens

I do not find any trace of these visual organs, but the other characters correspond so closely with those of the larger specimens, that I have little hesitation in pronouncing such slight differences as may exist as entirely due to disparity of age and growth. In reference to the minute nematodes which I have only examined with the naked eye, I have to state that they appear to me to be characteristic examples of the *Spiroptera microstoma*, which I am in the habit of speaking of as the *small-mouthed threadworm*.

In the next place I have the pleasure to acknowledge, through Professor Simonds, the receipt of a box and jar, together containing a somewhat larger collection of entozoa forwarded to the college by Mr. Spooner Hart of Calcutta. At present I am scarcely in a position to do full justice to Mr. Hart's specimens; but rather than delay my notice of them, I proceed at once to state that the preparations comprise examples of worms from the horse, ox, and dog, together with others taken from the vulture and duck. Referring in the first instance to the contents of ten small bottles enclosed in the box, I notice that five of them contain equine parasites. The bottle catalogued as "worms from the margin of the ileo-cœcal valve, obtained from a recently imported Australian horse," encloses several examples of *Tænia perfoliata*, and a solitary sexually mature *Strongylus armatus*. The bottle recorded as containing "nematoda from amidst the contents of a horse's stomach," contains about a score of the last named strongle, together with a large quantity of the small-mouthed maw-worms (*Spiroptera microstoma*) closely coiled together. The third bottle is described as containing "two large nematoidea from the scrotum of a horse," and likewise a "small worm from the fourth stomach of an ox." The former parasites are evidently examples of the papillated threadworm (*Filaria papillosa*), whilst the latter specimen is a moderate-sized nematode apparently hitherto undescribed. It will require further examination at leisure to determine the question. The fourth bottle contains "nematoda from the abdominal cavity of a horse," which are also characteristic examples of the *F. papillosa;* whilst the fifth is correctly described in Mr. Spooner Hart's catalogue as containing specimens of the "*Filaria oculi*," four in number. At least, if Clarkson's nomenclature be allowed to stand, this identification is sufficiently correct; but, as I have repeatedly pointed out to my class at the college, this so-called "worm in the eye" is in reality the already mentioned *Filaria papillosa*, which infests various parts of the body. To be sure there are two eye-worms, namely, the large example just

referred to, and the parasite that, by way of contradistinction, I am in the habit of calling the small eye-worm (*Spiroptera lachrymalis*), which worm, however, I do not find in Mr. Spooner Hart's collection. The sixth bottle, labelled "nematoid parasites from the vomit of a young dog," contains numerous worms that are clearly referable to the common *Ascaris marginata*. Of the remaining four bottles three of them contain worms from the vulture, whilst the last bottle is recorded as showing "three small nematoid parasites found under the cuticular lining of the gizzard of the horned duck, of the Oude district." These last-named are apparently specimens of Rudolphi's *Strongylus nodularis*. The worms from the vulture include a considerable number of nematodes "from the intestinal canal" referable to the *Ascaris depressa*, besides several smaller ascarides "from the stomach," and one still more minute nematoid "found on the outer wall of the intestine." So far as I am aware, neither of these two latter forms have at present been scientifically described in any of the treatises on helminthology.

Finally, in regard to the parasites separately forwarded and contained in a jar, I can only at present observe, that they are characteristic examples of the equine entozoon which I am in the habit of designating as the large-mouthed maw-worm of the horse, or *Spiroptera megastoma*. The peculiar habit which this entozoon has of taking up its residence in little tumours, or "abodes," as Mr. Hart not inappropriately terms them, is well known to helminthologists. He compares these abodes to the fortresses of the mole or *Talpa*, but that analogy is, I fear, scarcely allowable. These growths are formed between the mucous and fibrous layers of the wall of the stomach, and they are of great pathological interest. They were, I believe, originally discovered by Reckleben at Berlin; and they are, I suspect, by no means uncommon. Out of twenty-five horses examined by Valenciennes, these parasites and their tubercles were detected in no less than eleven separate animals.

In conclusion, I may remark, that other gentlemen have at different times forwarded to me specimens of this extremely interesting parasite; and, if I recollect rightly, there is a fine specimen, which I found some years back, in the museum stores of the Hunterian Collection, Lincoln's Inn. I did not recognise its nature at the time that I drew up the catalogue of the Entozoa, but I have since satisfied myself as to the true character of the specimen.

OBSERVATIONS ON BURSOTTEE.

By F. F. Collins, M.R.C.V.S., Officiating Inspecting Veterinary Surgeon, Bombay Presidency.

During my short stay in India the disease called bursottee has during the rainy seasons been constantly brought under my notice for treatment, and the obscurity which has hitherto attended the clinical history of the disease is most undecided and vague in reference to its immediate origin and the minute anatomical peculiarities which characterise its growth.

The disease invariably shows itself at the commencement of the rainy season, and as a rule spontaneously heals at its close. It is to be found in all parts of India, but most prevalent and most severe in a hot muggy atmosphere, such as is to be found in Bombay during the rains. The parts of the animal most subject to its attacks are those to which water is oftenest applied, viz., the legs and face. On other parts of the body the disease is sometimes present, but such exhibitions only appear on horses that undergo a daily ablution, evaporation being allowed to follow, and in horses that once show a bursottee diathesis an ordinary wound is alone sufficient to establish the disease.

The appearances of a bursottee sore differ from all other abrasions; it commences generally at an unobserved spot, and gradually extends outwards from its centre, and when closely observed it impresses you with the belief that the disease is absorbing the healthy textures, or, to speak more pathologically, as if the disease produced a disintegration of the tissues immediately in contact with it, and then apparently utilised such decomposed tissues. The surface of the ulcer is dry, and if left exposed dark in colour, having minute papillary-like points studding it, and exhibiting minute gallery-like sinuses running between these points into the substance of the sore. There is, I may say, no discharge, or if the moisture below the summit of these various papillary eminences might be called a discharge, it is of an aqueous character. The sore at first gives the idea of a dry cancer, but without a specific basis of attachment, and, when manipulated, a hard root or kernel can be distinctly felt, which yields in every direction. Hard tissue are always avoided, but the softer structures prove a favorable locality for germination.

The question arose to my mind, Of what nature is this dis-

ease? or have we any disease simulating it? Now, I think if we view the peculiar characteristic of the disease, we must more or less be impressed with a conviction that an active foreign agent is in existence to produce appearances so peculiar, and I do not know of an agent capable of producing such peculiarities other than that of a parasitic origin, and that parasite I conceive to be of vegetable organization; and the more I have noticed the various peculiarities which stamps the disease the more decided have I become in my convictions upon the point. I know of no class of disease whose origin, course, periodical appearance, limitation, and pathological character, when taken collectively, becomes so inexplicable when viewed in any other light than that of its parasitic origin, and by viewing it in this light we become more reconciled to its peculiarities. The knowledge of the development and growth of vegetable parasites is in its infancy, and I do not know of a wider field for future investigation. It is wonderful to see how vegetable parasites can penetrate the shell of the hardest unbroken fruit stone; how much more easily can they penetrate the horse's skin!

It is now upwards of twelve months since I was first impressed with the belief of the existence of a vegetable parasite in a bursottee ulcer, and I framed my treatment accordingly, which has been both simple and successful. When the disease appears on any part capable of sustaining a bandage, I fill a fine-pointed hollow tube with one pint of carbolic acid to twelve of water, and puncture the body of the ulcer in various parts, leaving a portion of the fluid when the tube is withdrawn. I then keep the parts dressed with carbolic acid and oil, one to twenty on fine tow, and bandage over. Under this treatment I have found at once a healthy ulcer established. In parts not capable of receiving a bandage I insert minute portions of arsenic into the substance of the sore, which produces a slough of its centre; the attendant then applies the oil-and-acid mixture on every occasion that he enters the stable: such treatment is as effective as the preceding. As but few horses are susceptible of developing bursottee, I look upon such as possessing a bursottee diathesis of constitution and treat them constitutionally likewise.

I much regret that it is out of my power to put the probability of a quibble upon the subject of bursottee beyond a possibility, for, alas! no instrument of sufficient power is within my reach to investigate microscopically the minute character of its component parts; however, I hope by the end of next rains to clear up satisfactorily the question whether bursottee is or is not of parasitic origin.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.G.S., F.L.S., &c. &c.

(*Continued from p.* 709.)

The Amarantaceæ, though here separated from the Chenopods, have yet so many points of resemblance as to make a clear line of demarcation most difficult.

Professor Lindley says that—"Brown remarks (Prods., 413) that he has not been able to ascertain any absolute diagnosis to distinguish them by, for the hypogynous insertion attributed to their stamens is not only not constant in the order but is also found in Chenopods. Martius in a learned dissertation upon the order describes Chenopods as being apetalous and Amaranths as polypetalous, considering the bractlets of these latter as a calyx, and that which I call a calyx, a corolla. But it seems to me that this view of their structure is not borne out by analogy, and that it is impossible to believe the floral envelopes of the two orders to be of a different nature."*

But leaving these theoretical views we will proceed to speak of the Amaranths by directing attention to the order, and then by describing two genera, namely, Amaranthus and Celosia. According to Mr. W. Thompson, under the name Amarantaceæ are included about 500 species of weeds, or, occasionally, showy annual plants (very seldom undershrubs), with inconspicuous apetalous flowers, in almost all cases of a scarious texture, and most commonly with a white colour, although now and then pink, or orange, or intensely crimson. They are very nearly the same as Chenopods, a still more weedy order. They occupy dry, stony, barren stations, or thickets upon the borders of woods, or even salt marshes; are much more frequent within the tropics than beyond them; and are unknown in the coldest regions of the world. Many of the species are used with the addition of lemon-juice as pot-herbs, on account of the wholesome mucilaginous qualities of the leaves. *Gomphrena officinalis* and *macrocephala* in Brazil, where they are called Paratodo, Perpetua, and Raiz do Padre Salerma, are esteemed useful in all kinds of diseases, especially in cases of intermittent fever, colic, and diarrhœa, and against the bite of serpents.†

Amaranthus is well known to our gardens under the

* 'Vegetable Kingdom,' p. 510.

† 'The Treasury of Botany,' vol. i, p. 46.

names of Prince's Feather, and Love-lies-bleeding, and their dark red or crimson pendulous or upright racemes of flowers are favorites, especially with the cottagers. Their hues, however, are far richer in warmer climates; in the States, for example, as we have seen, the colours of some of the species are so striking as to make the species great favorites, and even with ourselves a fine warm summer much enhances the beauty of the Prince's Feather. In relation to this subject of colour as dependant upon climate, Mr. Thompson says:—"In the gardens of the Southern United States these hues are so richly developed as to have procured for it the popular appellation of 'Joseph's coat.'" The genus Amaranthus presents a series of perfectly innocuous plants; they may indeed be eaten like spinach, but it is certainly not so palatable.

Celosia is a genus of Amaranthads nearly allied to the Amaranth itself, and, like it, well known to us through cultivated specimens. The species of this genus will be found to be even less hardy than the foregoing, requiring the hothouse to bring them to perfection. The Celosia is best known to us by the cultivated Cockscomb, the *C. cristata* of the nurseryman. This, however, is but a monstrous form of the plant, whereby its stems or branches have become anastomosed or fasciated, thus producing the curious form from whence its popular name is derived. Nurserymen are now getting to grow more natural forms in the many pyramidal varieties which are now in favour; these are certainly much more graceful than the old Cocksfoot, which, however, is a curiosity much in favour, especially with amateur gardeners.

The various forms and different colours even the Cockscomb can be made to assume have given rise to many names which may be said to be daily increasing, but the spicate species, of which Carter catalogues seven from China, are at present features in most large establishments. In Carter's 'Vade-Mecum for 1874' we find the following note upon these:—

"Magnificent plants for greenhouse or conservatory decoration, producing elegant plume-shaped spikes of flowers, succeed best if treated similarly to Balsams; look well in vases out of doors during summer."

From these notes, then, we may conclude that this order is conspicuous for the form and colours of its plants in the mass, and not to any conspicuous inflorescence, as the parts of the flowers in themselves are small and usually uninteresting. If we sum up the qualities of the order, we may say that they are remarkable for their absence of any active

kind. Long, then, may the nurseryman hold to them as curious protean pets!

Piperales.

In the Piperal alliance we have a series of plants so distinct in every way from the preceding that their affinity is exceedingly difficult to make out; at the same time, as suggested by Professor Lindley, the alliance depends upon the assumption that Piperals stand in near relation to Urticals, and that Chenopodals are the bisexual analogue of the latter. Granting this, which seems to be supported by strong evidence, we must then suppose that Piperals are a lateral sprout from Chenopodals, directing itself not onwards to the next alliance, but backwards, towards the frontiers of the Diclinous sub-class, to which the occasional inequality of the flowers of Pepperworts and Chloranths evidently points.

Piperals are clearly indicated, according to the author just referred to, "by their naked flowers, constantly arthotropal ovule, abundant mealy albumen, and minute embryo, which is either external or only just within the surface." The alliance contains only three natural orders, the typical one of which we shall refer to under the name of

Piperaceæ, *Pepperworts*.

This order will be best illustrated by a description of the plant from which our pepper is derived, which we quote from the pen of Dr. Masters:—

"*Piper nigrum* yields the pepper of commerce, a condiment that has been held in high esteem from the earliest times. It is frequently mentioned by Roman writers of the Augustan age, and it is related that in the fifth century Attila demanded, among other things, 3000 pounds of pepper in ransom for the city of Rome. Pepper is cultivated in the East and West Indies, Sumatra, Java, &c., but that which comes from Malabar is held in the highest esteem. The Pepper-vine will, if left to itself, attain a height of twenty or more feet, but in cultivation it is found more convenient not to allow it to exceed the height of twelve feet. The plants are placed at the base of trees that have rough or prickly bark, in order that they may the more readily attach themselves to the trunk. In three years they produce their spikes of fruits, and continue to do so for some seven or eight years, after which time they become less productive. The fruit when ripe is of a red colour; it is gathered before it is fully ripe and spread on mats in the sun, when it loses its

red colour, and becomes black and shrivelled, as we see it in the pepper corns of the shops; this is black pepper, white pepper is the same fruit freed from its outer skin by maceration in water and subsequent rubbing; occasionally it is rendered of a yet paler colour by being submitted to the action of chlorine."

The active principle of pepper has been named Piperin, and is thus described by Pereira:—

"PIPERIN.—This substance was discovered by Oersted in 1819, but was more accurately examined by Pelletier in 1821. It exists in black, white, and long pepper, and also in cubebs. It is a crystalline substance, the crystals being rhombic prisms with inclined bases. It fuses at 212° Fahr., is insoluble in cold water, and is only very slightly soluble in boiling water. Its best solvent is alcohol, the solution throws down piperin when water is added to it. Ether dissolves it, but not so readily as alcohol. Acetic acid is likewise a solvent for it.

"Piperin, when pure, is white, but as met with in commerce it is usually straw-yellow. It is tasteless and inodorous. It was at first supposed to be an alkali, but Pelletier has shown that it possesses no analogy with vegetable alkalies, and that it is related to the resins. With strong sulphuric acid it forms a blood-red liquid. Nitric acid colours it first greenish-yellow, then orange, and afterwards red. The action of hydrochloric acid is similar. Its formula according to Regnolt is $C_{34}H_{19}NO_6$."

Piperin has been used as a febrifuge, and pepper itself has been so employed, but its usual employment in medicine is a stimulant and carminative, and as such it is used in veterinary practice, being, according to Professor Tuson, "principally employed as a stomachic and carminative in simple indigestion, and as an aromatic to mask the unpleasant flavour of many medicines."

We have frequently used it in cases of colic of different animals united with ginger and some stimulating fluid, as gin or peppermint water.

Its more general use is as a condiment, and the extent to which it is so employed may be deduced from the fact that 50,000,000 lbs. are annually grown, which is estimated by Mr. Crawford as under :

Production of Pepper.

	lbs.
Sumatra (West Coast) . . .	20,000,000
Sumatra (East Coast) . . .	8,000,000
Islands in the Straits of Malacca .	3,600,000
Malay, Peninsula	3,733,333
Borneo	2,666,667
Siam	8,000,000
Malabar	4,000,000
Total . . .	50,000,000

The quantity of pepper imported into this country by no means represents the number of pounds which is supposed to be consumed, as probably no article is more adulterated, and probably linseed meal is the most abundant, as it is the most innocent of the augmenters of the assumed quantity of pepper.

Cubeb pepper may here be referred to as belonging to the order *Cubeba officinalis* and others furnishing the drug known by the above name. Their uses are well known, not so perhaps their *modus operandi*, though probably Sir A. Cooper's notion is the right one. He thinks that Cubebs produce a specific inflammation of their own on the urethra, which has the effect of superseding the gonorrhæal inflammation.

Cubebs are not employed in veterinary medicine, but we cannot help thinking that they might prove useful in some of the urinary diseases to which the lower animals are liable.

From the foregoing notes it will be seen that all the plants mentioned in this article are of tropical or sub-tropical growth, and it would appear that while in the Amaranthads the action of the sun occasionally manifests itself in the production of the most gorgeous colour, the like stimulus, in others has resulted in the development of strong stimulating qualities, as "hot as pepper" being not uncommonly used to designate any matter which has the property of "biting the tongue."

CONTAGIO-INFECTIOUS PLEURO-PNEUMONIA.

By W. A. Cox, M.R.C.V.S., Staff-Inspector, Dublin.

From the fatality attending attacks of this disease, from its peculiar nature, and from the legislative measures and precautions that are adopted both for its suppression and

against its introduction, it has, by name at least, become common property.

Outside the profession its true nature is not generally known, but it is not uncommon for the reproach to be cast upon us, "Ah! but with all your science you cannot cure pleuro-pneumonia!" The individuals using this language belong to that class who think it is possible to *cure* all diseases, and that the death of any animal is only the result of ignorance or inattention, and they have vanity enough to believe that if *they* had studied the subject their success would be something wonderful. What a pity it is that such clever men are lost to the profession! With the knowledge they have probably gained in a few conversations upon the subject, or a casual glance at some newspaper article—they presume to call attention to *their* treatment, affirming that if it were followed out greater success would be attained than has yet been.

Before restrictive measures were in force, and when cases were treated for this disease, such characters caused incalculable mischief, inducing stock-keepers to delay seeking proper assistance, and often from want of knowledge, or prejudice, preventing the owners from isolating the diseased animal, or taking any precautionary measures against the extension of the disease.

There are numerous cavillers at the name that has been given to the disease, but I think that it is not inappropriate, indicating, as it does, the parts affected; and by using the prefix we distinguish between it and the sporadic or inflammatory type of pleuro-pneumonia, which is non-contagious. It has too the right of *use* or custom, and however desirable it would be to give to diseases more correct names, if we change one we ought to change many of them, and a confusion would be created in nomenclature that would be in a measure obstructive and unintelligible. This malady was introduced into this country by the importation of diseased stock in 1842, and was then called the "new distemper," in contradistinction to the foot-and-mouth disease which had appeared in 1839; it was afterwards called by stock-owners the "lung distemper," and by others the "fatal disease," or "fatal complaint," the former probably from the locale of the disease, the latter from its most frequent termination. By the profession it was given the name it still retains. Since its introduction it has ravaged the country, prevailing with extraordinary severity in some years, especially in 1848 and 1854-7, occasionally subsiding, only solitary and isolated cases being found, but these con-

firming the opinion that the country has never been clear since the first outbreak.

Pathology.—On its first appearance many opinions were advanced as to its true character, and speculation was rife; symptoms were quoted and various theories advanced, but almost all were unanimous as to its contagious and infectious nature.

Amongst the earliest communications were those of Mr. Barlow, of Wilmslow, who speaks of its invariably fatal termination, and one from my father, the late William Cox, who, with a great practical acquaintance, was quite convinced of its infectious character.

Professor Simonds, in a lecture delivered before the Royal Agricultural Society of England, published in the 'Transactions of the Veterinary Medical Association,' gave a thorough exposition of the disease, but with this and a few other trifling exceptions it has not received that attention that from its importance it is entitled to.

It is a *specific* disease, said by some to be due to the introduction of a peculiar principle or *ferment* into the system of the animal, the organism being in a condition favorable for its reception and development. This *ferment*, it is argued, is thrown off by animals suffering from the disease, and some go so far as to say, that were all similarly diseased animals removed it would not again appear; but in opposition to this theory, it is argued that there must be a "locus in quo" where the disease primarily originated, and that under circumstances favorable to its development it may originate in *any* locality.

Cases have occurred under my own observation apparently *spontaneous*, and precise and strict inquiry could not show them to be due to the influence of contagion. These have been in herds that have had no connection with animals affected with this malady, nor has it been known to exist in the district.

If, as is said, there exist *per se* in the blood an active putrescent or fermentisable principle, it is extremely probable that adventitious circumstances, as bad diet, impure ventilation, exposure—and it is a noteworthy fact, that after "spoiled" harvests and wet seasons, this disease has been extremely prevalent—"cum multis aliis," of a similar kind, may so alter or change its character as to produce this affection even without the introduction of the virus of contagion.

In whatever way it is produced it is attributable to a peculiar and specific change or alteration in the constituents of

the blood, and it is remarkable that it has no analogue amongst other animals, existing only amongst the ox tribe.

By the term specific we recognise it as originating from a certain fixed—although indefinable—cause or causes, acting in a particular manner, and producing one train of symptoms, in fact one disease, and that it does not simulate any other malady. That however varied the easy recognisable symptoms may be, all animals suffering from it are indissolubly linked together by its having one common and local determination —*the lungs*.

It is generally received that it originates primitively in a changed condition of the vital fluid ; this is either *relative or actual*. A few facts, the result of a lengthened acquaintance, may bear upon the question and be interesting to some of your readers.

Blood when drawn from the system of an animal labouring under this disease coagulates in ropy shreds ; its colour is extremely dark, " black as treacle," and as it flows it appears of a maroon black colour, and imparts a darker stain to the hand than does normal blood ; after allowing it to remain some time the coagulum shrinks but slightly, and the amount of serum is very small. Sometimes, however, as the blood flows it becomes almost brick-red in colour, and appears as if it had been puddled with some light material. The clot when formed is tenacious and leathery. After the malady has existed for some period the character of the blood changes. We find that, instead of presenting as it flows a shining, rich, unbroken surface, the stream seems to be formed of a fluid, having solid particles, or rather, capable of greater reflection than the entire current, and much similar to an ill-shook mechanical mixture. The clot is imperfectly loose and flabby, and can almost be broken up by shaking, the serum seems considerably in excess and is turbid or rather opaquely flaky.

(*To be continued.*)

PARTURIENT APOPLEXY IN THE COW.

By John Gerrard, M.R.C.V.S., Market Deeping, Lincolnshire.

Etiology, or the causation of disease, in the lower animals, is principally of a positive kind, or generally cognisable to the senses. Most of the causes are of a ponder-

able nature, such as excess of eating or drinking, overwork, undue exposure, or interference with the due elimination from the body of its waste products, faulty secretion, or hindered excretion. Others there are which owe their causes to the diminution or excess of certain imponderable agencies, as light, heat, electricity, and the like ; while others, a somewhat numerous and important class, owe their cause to an advancing civilisation, indicated by the rage for early maturity in our flocks and herds demanded by the progressive tendencies of the age in which we live. To this latter class of causes do we owe parturient apoplexy and its allied diseases.

The increasing frequency of this disease has kept pace with the improvements in the breeding and feeding of stock rendered necessary by the demand for fast-growing breeds. In districts where agricultural improvements are not very manifest, and the improved breeds are not found, parturient apoplexy is rarely met with ; indeed, it seems to follow the track of civilisation and improvement.

It is a well-ascertained fact that, when animals are removed from their primitive condition, their liability to disease is increased. It is the same also in the human family, many of whose diseases are induced by the changes in the modes of living necessitated by the advancing tendencies of the age which induce new modes of life and thought, and produce disturbances in the working of those social, moral, and intellectual processes which constitute the true life of man.

But although these relationships are disturbed in ourselves and induce diseases, they do not directly affect our patients, for the reciprocal action of mind and body is not recognised as a cause of disease in them. Still, they are affected indirectly by these tendencies, and directly in what are known as the " physical bases of life."

Man and animals cannot maintain health if their food does not contain the proper proportions of the elementary constituents of their bodies, and common instinct, with experience, tells us that these classes must be associated in due proportions under a variety of modifying circumstances.

A long-continued use of highly nitrogenous foods renders the system extremely liable to disease, and notably so in the case of pregnant animals, which usually have too little exercise afforded them, causing extra work for the kidneys and other eliminating organs, which often become diseased and are rendered useless to the organism. More especially is this the case if the mineral constituents of the food are deficient

which are essential to the organic processes by rendering the plastic constituents of the food and the respiratory materials fit and proper for the support of life.

The enormous and increasing consumption of artificial foods of the present day, in which the nitrogenous elements are regarded as the standard of value, contrast strongly, both in nature and amount, with those of twenty years ago.

No cultivation of the soil can be profitable at the present time unless an amount of artificial manures and foods be used that would have been deemed utopian a quarter of a century ago, and these stimulating manures and artificial foods are not to be used to excess on the soil or the system of animals with impunity.

But although improvements in agriculture may lessen or diminish the tendency to certain other forms of disease, it cannot, I think, be doubted that it is the proximate cause of this as well as other closely allied diseases. But though the proximate, it cannot be regarded as the ultimate cause, for it seems connected in some way with a predisposition in the economy of the cow that we do not find in our other domestic females, and which we have not yet succeeded in discovering.

The explanation of it by Professor Barlow is, I think, the most plausible, indeed, the only one that can be regarded as such, viz. "the increased vascularity of the system to meet the requirements, not only of her own offspring, but the production of an almost universal and typical food for man, together with the increased development of the nervous system and its susceptibility of morbid impressions at the time of parturition."

"Should, then," says Professor Barlow, "any constitutional or other cause interfere so as to prevent a secretion of milk in full proportion to an existence of its elements in the system, or this effect be produced by any tardiness of the udder in resuming its functions, we can easily conceive that, under such circumstances, some organ or class of organs previously wrought upon by unusual stimulus would, from the consequent predisposition thereto, assume a diseased action."

But what is this "*constitutional* or *other* cause" to which the professor refers, that is, as it were, the weight to the clock, when vascularity, nervousness, and parturition, are the keys which have wound it up? What is it that lights the fire of disease, which goes on burning after the lighted match has been applied?

The oracles are dumb! Science is silent!

"Wherever," says Liebig, "it is vouchsafed to the feeble senses of man to cast a glance into the depths of creation, he is compelled to acknowledge the greatness and wisdom of the Creator of the world. The greatest miracle which he is capable of comprehending is that of the infinite simplicity of the means by the co-operation of which order is preserved in the universe as well as in the organism, and the life and continued existence of organized beings are secured."

For an answer to these questions we have to fall back upon predisposition, constitution, reflex nervous irritation, *centric* or *eccentric*, and other easily employed but ill-understood phrases, and by the use of which we only shunt the etiology into a siding in trying to explain phenomena which we had much better confess we do not understand.

One thing is clear, that the pregnant condition is indispensable to the production of the disease, and in the great majority of cases parturition is the determining cause, and is always inseparably connected with the power of yielding a large supply of milk; hence Alderneys are very subject to it. These essential conditions of the disease point to some derangement in the circulating fluid or some disproportion of the elements of healthy blood, which, not finding their proper outlet, are retained in the system, undergo some change whereby new products are formed which seem to have some affinity for the nervous system, or at least act upon it, and thus produce the disease.

I am aware, however, that this is only shifting the track, but I am convinced it is the right one, and until pathological chemistry shall have made great advances we must be content to wait for the proper solution of this great question. No other hypothesis which has yet been adduced will satisfactorily account for all the phenomena of the disease unless we admit some specific morbid change in the circulating fluid.

The highly nitrogenous nature of the fluid the cow is destined to yield, the elements of which must exist in the blood from the nature of the food with which she has been supplied, and which, not being eliminated, would, with the effete elements of a disintegrating uterus, favoured by a checked renal secretion, undergo decomposition and thus the poison be developed.

The almost total absence of any well-marked change in the brain, its membranes and prolongations, the rapidity of the attack and the quickness of its course, and the sudden decomposition of the body after death, all point to the toxæmic nature of the disease.

Now, it is admitted on all hands that the secretion of milk is stopped, and, indeed, inducing the udder to assume its functions is one of the principal objects to be attained in successfully treating the disorder; if this, then, the principal outlet for the plastic elements of the blood in the cow, be shut up, the kidneys are the only other organs whereby they can be eliminated, and these being already taxed beyond their capabilities, indicated by an increased flow of urine and the presence in it of albumen, a condition of system is induced favorable to the development of uræmic or other poisons.

Albumen has been present in all cases in which I have examined the urine, and this is a feature of the disease which has received too little attention among veterinarians. But albumen in the urine of pregnant animals may be said to be a normal condition of the fluid, and its presence at the time of parturition need not excite our wonder when we think on the pressure of the gravid uterus on the renal veins and the ureters, sufficient to produce passive congestion of the kidneys. But the kidneys are the outlet from the body of its nitrogenous elements represented by urea, and this being detained in the system with the other effete materials already referred to, a diseased condition of the fluids is the result.

Dr. Frerichs, the principal authority on this subject, says "that urea, when thus or when otherwise accumulated in morbid excess within the circulating system, does not, according to his observations and that of others, produce any very special intoxicating or poisonous effects upon the nervous system, merely *per se* or simply as urea, but that large quantities of it accumulated in the system are extremely liable to decomposition and the formation within the body of various new organic compounds of an alkaloid character, some of which, like morphia, strychnine, and coneine, produce different diseased states by exerting different toxicological effects upon the cerebro-spinal and other systems."

Urea, as urea, does not, in his opinion and according to his experiments, "produce convulsive and comatose effects, but these effects are produced by a sudden excess in the blood of carbonate of ammonia, a salt which urea readily forms when it becomes decomposed."

"But," says the late Sir J. Y. Simpson in his 'Clinical Lectures,' "when the whole constitution and chemistry of the blood becomes deranged and altered by the sudden accumulation of the excrementitial materials of the urine within it, as is always liable to happen in puerperal albumi-

nuria, other organic toxicological agents may become developed within the system from the decomposing urea or other components of the urine—possibly some of these newly formed products or agents of an *alkaloidal* character—and one or other of which may be as certain of exciting *disease* as an overdose of morphia, or brucine, or other poisonous vegetable alkaloids, is certain of exciting their special toxicological effects upon the economy."

Here, then, in the puerperal condition of the cow we have all the elements capable of inducing a diseased state of the fluids if retained in the system, and that they are so retained is abundantly manifest.

An increased vascularity of the system is necessary for the production of the fluid Providence has destined the cow to supply, and this is, perhaps, the principal reason why she, of all the domestic animals, is subject to this disease. The largely developed and excitable state of the nervous system consequent thereon, added to the superabundance of nitrogenous elements in the blood necessary for its production, and not being eliminated, soon undergo decomposition, and the development of a poison which is known to have an affinity for the nervous textures.

These are, I think, the "*constitutional* and other *causes*" which render the cow much more susceptible of disease referred to by Professor Barlow. We only want to possess the match that lights up the fire of disease in these elements, but for it we must, I am afraid, be content to wait the slow movements of pathological chemists. And while waiting let each one try to forward their efforts by freely and fearlessly recording observations and experiments that can in any way assist in the solution of this or other subjects, and so contribute to the advancement of the science and art of veterinary medicine.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of September, 1874, have been

found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign Ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Oporto .	London .	Foot-and-Mouth .	15	...	...	...	15	15
Total.			15	...	...	...	15	15

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 13th October, 1874."

CATTLE PLAGUE.

According to the latest reports from Warsaw there has been a severe outbreak of cattle plague recently in Poland in the Government of Suwalki. The disease was recognised in thirteen districts.

Cattle plague also exists in the Austrian Empire in the undermentioned places:

Buckowina, in four districts; Carniola, in two districts; Lower Austria, in one district; Croatia, in four districts; and on the Croatian Sclavonic military frontier.

The malady has again appeared in Hungary.

Reports from Constantinople state that cattle plague exists in Albania.

In several districts in Russia the disease continues. In the Don Cossack Territory the affection has disappeared or has greatly diminished.

Accounts from Brindisi are to the effect that the plague has decreased considerably, only two farms being now infected.

PLEURO-PNEUMONIA.

There is no diminution in the number of attacks of this disease since our last report. The system of compulsory

slaughter as it is now carried into effect evidently does very little towards arresting the progress of the malady.

An outbreak of pleuro-pneumonia has occurred in the vicinity of Tonning. Two oxen were attacked in one of the sugar factories in Holstein. The animals were killed, and the disease has not spread.

FOOT-AND-MOUTH DISEASE.

Foot-and-mouth disease still continues in Portugal, and it is reported that an outbreak has occurred at Tunis. In this country the affection is not prevalent to any serious extent. At one time it was apprehended that the malady would spread over the kingdom as it did in the last outbreak, but fortunately for reasons which are not apparent it began to decline in the summer, and has up to this time shown no tendency to assume the epizootic form.

A few cases of the disease have been detected among Irish cattle landed at Liverpool, but it does not appear that the affection prevails to any extent in Ireland. The inspectors at Ballinasloe fair report that no instance of the disease came under their notice.

SHEEP-POX AND SHEEP-SCAB.

In the last returns from Pomerania, sheep-pox is reported to exist in several districts in Stettin, Stralsund, and Köslin, but no mention is made of sheep-scab.

The latter disease maintains its usual state of prevalence in this country.

Facts and Observations.

Narcotising Horses.—We learn from the *Gazette Médicale de Bordeaux* that an eminent veterinary surgeon has informed the Medical and Surgical Society of that city that the coachmen of certain families had been for some time in the habit of administering chloral to the horses in their charge, so as to make them easier to ride or drive. It appears that the drug acted like a charm, for horses which had previously been so spirited as to give much trouble to their drivers became as quiet as lambs after a few days of this hyposthenic treatment. This great change naturally

attracted the attention of the owners of the animals, and they sent for the veterinary surgeon to ascertain the cause of this sudden gentleness. That functionary noticed a certain tendency to sleep in the animals; but scarcely knew to what to refer this unusual condition, when in one of his visits he chanced to find a bottle half full of chloral. Here, then, was the *corpus delicti*, and when the veterinary surgeon questioned the delinquent coachman as to the use he made of the drug, the latter, after much hesitation, owned that, following the advice of a brother whip, he gave his horses a dose of chloral every morning to make them go quietly, and further, that many of the fraternity in Bordeaux followed the same plan.—*London Medical Record.*

Animals as Motor Powers.—M. Marey has laid before the French Association for the Advancement of Science some interesting observations on the employment of animals as motor powers. He proves by means of a very elaborate instrument that the movement of animated beings as motor powers takes place by jerks, whence result shocks, and consequently a waste of labour. As an illustration of this theory, M. Marey cites the effort necessary to draw a burden behind one. If the necessary force be transmitted by means of a rigid or almost unextensible strap, for instance, of leather, the movement is jerky and more difficult than if it were transmitted by an elastic strap. It would therefore be better to attach horses to the shafts with india rubber traces. He also gives as an illustration the manner in which boats are always dragged along the towing-paths by long ropes. It would be impossible, or at least very distressing, to employ short ones. The length of the rope, which alternately tightens or slackens by slow oscillations, has in this case the same effect as india rubber.—*Ibid.*

Action of Air and Water upon Lead. By J. Fordos (' Compt. Rend.,' lxxvii, 1099—1102).—The author considers that the danger of lead poisoning by the use of pipes of that metal for conveying drinking water has been very much exaggerated. He thinks that the cleansing of wine and medicine bottles with lead shot and water to be a more likely source of harm. When a bottle containing lead shot and water is shaken, the liquid rapidly becomes turbid, and deposits a white film of lead carbonate on the sides of the bottle. Several rinsings fail to remove this film, which may contain in an ordinary medicine phial five milligrammes of lead. White and red wine, quinine wine, and vinegar placed

in bottles which had previously been rinsed several times after shaking up with shot and water were found to have dissolved some lead.—*Journal of the Chemical Society.*

Action of Water on Lead and other Metals.—By Ad. Bobierre ('Compt. Rend.,' lxxvii, 1272).—Instances are given in support of the theory that the action of water on metals is greatly accelerated by the presence of air. When a ship's sheeting is corroded, the water-line is the part that suffers most. The rapid corrosion of a lead cistern, which came under the author's notice, is traced to the fact that it was repeatedly emptied and then quickly refilled from a jet with a heavy fall of water. In another instance the interior of a leaden water-pipe was coated with lead carbonate. This is attributed to the presence of air in the many chambers formed by the numerous bends which the pipe took.

When water containing magnesium chloride is distilled through metallic pipes, its action upon them is greatly intensified by the hydrochloric acid given off. Such a water when distilled with excess of lime scarcely attacks the metallic condenser.

The author's experiments confirm the theory of Fordos, that the compound resulting from the action of water on lead is very often in suspension in the water.—*Ibid.*

Santoninic Acid. By O. Hesse ('Deut. Chem. Ges. Ber.,' vi, 1280—1282).—Santonin is the anhydride of an acid, of which hitherto only the salts have been known. The free santoninic acid is obtained by adding an excess of dilute hydrochloric acid to a cold aqueous solution of the sodium salt, and shaking at once the milky liquid with ether. From the ethereal solution granular crystals soon separate out, which are recrystallised from alcohol.

Santoninic acid, $C_{15}H_{20}O_4$, forms white rhombic crystals, which are not coloured yellow by exposure to light. It is sparingly soluble in cold water, more freely in boiling water, and readily in alcohol, but not very freely in ether. Its aqueous solution has a strongly acid reaction, and when hot, decomposes the carbonates of sodium and calcium. The santonates have an alkaline reaction, and are not coloured red by alcoholic potash. When the acid is heated to 120°, it is resolved into santonin and water; the same decomposition is produced by adding sulphuric acid to its aqueous solution; hydrochloric acts in the cold in a similar way, but

more slowly, while by adding either of these acids to a hot solution of salt, santonln is at once precipitated.

Cannizzaro and Sestini have lately shown that when santonin is heated for some time with an alkali, it is converted into the stable santoninic acid, which is isomeric with santoninic acid, but cannot be reconverted into santonin.—*Ibid.*

On the Nature of Bleaching Powder. By C. Goepner ('Deut. Chem. Ges. Ber.,' vii, 270—272).—In this reply to Schorlemmer the author says that the action of hydrochloric acid on bleaching powder proves absolutely nothing, as any hypochlorous acid that might be set free would be at once resolved into chlorine and water; but the use of nitric acid must also be rejected, because the nascent chlorine might possibly be oxidized by hypochlorous acid. He therefore distilled freshly prepared dry bleaching powder with dilute sulphuric acid of different concentration, and found, as in his former experiments, that only chlorine was set free, and not a trace of hypochlorous acid formed. However, on using bleaching powder which had been exposed for some time to the air, or a moist commercial product, he obtained, besides much chlorine, a not inconsiderable quantity of hypochlorous acid. Odling's view was well known to him, but he could not at first adopt it, as the reasons given by Odling did not hold good. By his own researches, however, he arrived afterwards at the same conclusion, and never thought of a direct combination of chlorine and lime which is again resolved by acids into its constituents.

When bleaching powder is decomposed by acetic acid, one half of the active chlorine replaces hydrogen in the acid; this can be explained only by means of the formula $CaOCl_2$, and not by $Ca(OCl)_2 + CaCl_2$, because in the latter case only one fourth of the chlorine would replace hydrogen. Wolters has also proved that the compound $CaOCl_2$ is formed when chlorine is passed into milk of lime; for on shaking the product with mercury, a quantity of mercuric oxide is formed which is equivalent to the lime, a fact which cannot be explained by the second formula.

Note by the Abstractor.—Mr. F. Kopfer has commenced in our laboratory a research on the action of mineral acids on bleaching powder, and has found that when the freshly prepared dry product is distilled with dilute sulphuric acid, a *colourless distillate is obtained, which smells of hypochlorous acid, quickly bleaches indigo, and gives, on shaking it with mercury, a large yield of the oxychloride which Wolters has*

described. That hydrochloric acid is not suitable for the preparation of hypochlorous acid is quite obvious; dilute nitric acid certainly gives the best results, as it does not so easily liberate hydrochloric acid. Goepner's objection that it might oxidize the nascent chlorine is quite untenable, because chlorine is always produced by the action of oxidizing agents on hydrochloric acid, and can be combined with oxygen only in the presence of an alkali. In his first paper he has never adopted Odling's view, but says, "If hypochlorous acid is therefore not contained in bleaching powder, this compound must be the product of a direct addition (Aufnahme) of chlorine to lime;" and further on—"The decomposition of the bleaching compound by mineral acids is simply the separation of chlorine, with formation of the corresponding calcium salt:

$$CaOCl_2 + SO_4H_2 = SO_4Ca + Cl_2 + OH_2."$$

The other reasons which, according to Goepner, prove conclusively that bleaching powder contains the compound $CaOCl_2$, do not prove anything at all; for it is quite obvious that its action on mercury or acetic acid cannot be altered by multiplying the formula by two and then resolving it into $CaOCl_2 + CaCl_2$:

$$\begin{cases} CaOCl_2 + Hg = CaCl_2 + HgO \\ Ca(OCl)_2 + CaCl_2 + 2Hg = 2CaCl_2 + 2HgO \end{cases}$$

$$\begin{cases} 2CaOCl_2 + 2C_2H_4O = (C_2H_2ClO_2)_2Ca + CaCl_2 + 2H_2O \\ Ca(OCl)_2 + CaCl_2 + 2C_2H_4O = (C_2H_2ClO_2)_2Ca + CaCl_2 \\ \quad + 2H_2O. \end{cases}$$

Ibid.

The Chemistry of the Bones. By Rich. Maly and Jul. Donath ('J. pr. Chem.' [2], vii, 413—440).—1. The authors find that 100,000 parts of water dissolve, on the average, of gelatinous calcium phosphate 2·36 parts, of calcined calcium phosphate 2·56, and three parts of calcium phosphate from powdered bone. The experiments exhibit a wide range of solubilities with each of the three kinds of phosphate, and the temperatures at which the solutions were made are not noted.

2. It is concluded that the compound of ossein with calcium phosphate which exists in bones is a mechanical mixture, and not a chemical compound. The grounds of this conclusion are found in the facts that ossein when kept in contact with calcium phosphate does not enter into combination with it, and that other colloïd bodies, besides ossein and gelatin, such as albumin, when earthy phosphates are precipitated from the same solutions, are precipitated together with the phosphates.—*Ibid.*

THE VETERINARIAN, NOVEMBER 2, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

COMPULSORY SLAUGHTER IN PLEURO-PNEUMONIA.

THERE seems to be a gradually increasing conviction among stock owners and committees concerned with the carrying into effect of the provisions of the Contagious Diseases (Animals') Act, that the order which compels the slaughter of animals affected with pleuro-pneumonia should be either extended in its operation or revoked altogether. The fact is that, as the matter is now conducted, the stamping-out system is applied in a very partial and incomplete manner.

First, the centres of disease are not known, and there is little inducement for the owners of diseased cattle to publish the fact; indeed, their interests lie in the other direction. No machinery exists for the detection of the disease otherwise, and therefore only a few of the actual outbreaks are really dealt with at all. Animals from infected herds are sent to market and carry the disease into new districts.

When the existence of lung disease is made known by the owner of the diseased animals or in any other way, the chances are strongly against the animals being slaughtered as promptly as they would have been without the intervention of the authorities. The inspector has to visit the farm and examine the sick beast; his report has to be forwarded to the executive from whom the order for slaughter emanates; finally, the order has to be carried into effect under proper supervision. All this time the animal is capable of communicating the disease to other cattle, unless strict isolation has been secured, an object which cannot always, or even often, be attained.

The extension of this incomplete system of dealing with outbreaks of pleuro-pneumonia is not likely to be much more

effectual than its intermittent and irregular adoption has been in ridding the country of the disease. Nevertheless, the impression seems to be gaining ground that the application of the slaughter order to Ireland would effect much.

On Saturday, October 17th, the Norfolk Committee agreed to a resolution requesting the Court of Quarter Session to memorialise the Privy Council to extend the slaughter order to the whole of the United Kingdom or to rescind it.

On the same day the Duke of Richmond received a deputation of local authorities of Aberdeen, Banff, and Moray, at Huntley, near Aberdeen, on the same subject, of the spread of pleuro-pneumonia. The deputation, among other things, urged that the order to slaughter diseased animals should be extended to Ireland.

It was not alleged by the spokesmen of either deputation that Irish cattle suffer more from pleuro-pneumonia than English beasts do; but it must be admitted that the disease exists in Ireland, and that outbreaks of the affection in this country have often been traced to the purchase of Irish stock.

An effectual plan of eradicating the lung plague must perforce apply to the whole kingdom, but we apprehend that something more than the present measures will be necessary. In fact, if the work is to be done it must be set about in a serious manner, just as the stamping-out of cattle plague would be conducted if the disease were to appear in the country. Experience has clearly shown that no half measures are of use; and it would be almost as well to leave matters to take their course as to continue our present leisurely proceedings.

Reviews.

Quid sit pulchrum, quid turpe, quid utile, quid non.—Hor.

The Student's Guide to Materia Medica in accordance with the latest issue of the British Pharmacopœia. By John C. Thorowgood, M.D. Lond., &c., pp. 318. London: J. & A. Churchill, 1874.

The author in his preface states that "this guide is to supplement the pharmacopœia in the student's hands. Its object is to give an account of the chemical composition of medicines, to explain the chemistry of the various processes by which certain remedies are prepared, and of the reactions which occur in applying tests of their purity. . . . General principles of therapeutics have been mainly regarded, and the information given has been of as definite and positive a character as possible."

That this work will become a favorite among students we have no doubt, for it contains a very considerable amount of useful information in a small space. On the whole it may be relied upon as a safe guide to the elements of those branches of science with which it deals, but, like all first editions, it is not entirely free from errors. As exactness in science is all-important, we think that Dr. Thorowgood would add to the value which his book undoubtedly possesses if he were, in preparing his next issue, to submit the botanical and chemical portions to the revision of some of his friends who have specially devoted themselves to these departments of knowledge.

Journal of the Chemical Society, containing the Papers read before the Society, and abstracts of Chemical Papers published in other Journals. J. Van Voorst.

All high-class periodicals devoted to a special subject labour under the disadvantage that they appeal to a certain class which of necessity is limited, and they can hardly hope for any general acceptance. Yet seeing the enormous importance of chemical research, both in a practical and scientific point of view, a special claim may well be made for this particular branch of study. The recent effort of the chemical society to publish in our own language good abstracts of all the papers bearing on chemistry and its

relations to physiology, agriculture, and the arts that appear in foreign journals is an enterprise which undoubtedly deserves a wide support.

The 'Journal of the Chemical Society' consists of two distinct portions—the republication, *in extenso*, of papers read before the Society; the publication of the abstracts just mentioned. These abstracts embrace the following branches of chemistry:—1, general and physical; 2, inorganic; 3, mineralogical; 4, organic; 5, physiological; 6, vegetable physiology and agriculture; 7, analysis; and 8, technical chemistry. The reader is thus presented in rapid succession with a complete record of the recent progress of the science.

The Journal is published in monthly numbers of about 100 pages each; we certainly do not know of any periodical containing more information in the same space. We can commend the publication heartily, knowing it will prove of service not only to the pure chemist, but to all who study natural science or apply its results in their professional labours.

Extracts from British and Foreign Journals.

ON THE CHANGES GOING ON IN THE VEGETATION OF SOUTH AFRICA THROUGH THE INTRODUCTION OF THE MERINO SHEEP.

By Dr. John Shaw, F.L.S.

Not much has been written, as far as I am aware, on the direct influences of overstocking on the indigenous flora of some tracts of South Africa. I propose in this paper to show how the persistent and greedy system of overstocking farms has changed the flora, introduced and given undue influence to a worse herbage, and bids fair in time to change the climate and, with this, the whole character of the vegetation.

The Merino sheep have introduced, by the achenes clinging to their wool, one plant from Europe, the obnoxious *Xanthium spinosum*. This weed extended itself throughout the sheepwalks of the colony to such a degree, and so endangered the character of the wool through its achenes, that special legislative enactments have been made in regard to its extirpation; and rigid enforcement of penalties alone has

kept it from being a sweeping curse to the wool-producers. In the Orange-River Republic, were only until the last year this weed was allowed to revel undisturbed, save where some stray Dutch boer was given less to coffee-drinking and sleep and more to an intelligent regard for the future of his pasturage, it had so affected the wool of some parts of the country as to make it nearly unremunerative as a staple product. Tardy legislation on the obnoxious introduction had to be adopted there also.

Legislation is not likely, however, to do much for the colony in regard to the evil of overstocking; and indeed it is not apparent that there can be any other course open for the colony but that most effective one of an evil curing itself, and that generally falls on another generation.

Before entering upon the subject proper, it will be necessary to give an outline of the surface and physical features, and in connection with them a few observations on the distribution of the plants of South Africa. The Cape flora is a poor one in regard to types: its orders and genera are not many; its subgenera are more abundant; but there is a marvellous differentiation into species, and these are most variable in character. The Heaths, Mesembryanthemums, Senecios, &c., are conspicuous illustrations. South Africa is an extensive tableland, bounded on the north by the low-lying Kalihari desert and the valley of the Limpopo. In the Cape Colony we have two concentric semicircular ranges:—1st. The coast range, which runs from the Olifant river southwards in the direction of the Cape of Good Hope, and thence eastwards and east by north until it is lost in the Kaffrarian mountains. Between this range and the coast there is a belt of land varying from 50 to 100 miles in breadth. 2nd. There is an inner range of a similar character, but higher; and between it and the coast-range there is a more elevated belt of land. The culminating ridge of the tableland, cutting the colony as nearly as possible into two equal parts, runs from west to east (the great Sneeuwberg, as it is called, rising to the height of from 7000 to 8000 feet), and is continued north-eastward and then northwards by the Witbergen and the Drakenberg (which forms the western boundary of Natal) to the valley of the Limpopo.

This disposition of the mountain ranges has obviously much to do with the climate of the Cape. The coast strip of land is soaked in moisture, and is luxuriant in woods and vegetation. The flora is therefore a rich one, and the landscape is adorned with woods of a magnificent character. It has the celebrated Zitzikamma and Knysna forests, as yet,

on account of their impenetrable character, but little investigated by the botanist. The inner strip contains the inexplicably isolated region of heaths in the south-west, and is drier, but still, on account of the height of its mountains, well wooded and watered. But starting from the curve of the inner range in the south-west, and going in a direction to the culminating ridge, there is the dry tract, forming a peculiar subprovince of plants, known as the Karoo, and visited only by periodical but short-lived though heavy rains which run over a dry and hard-baked ferruginous soil to the watercourses, without doing much to soak it or suit it for other than the scrubby deep-rooted shrublets and bulbs of the region. Beyond the great central Sneeuwberg range we have in a direction north-eastward what is known as the Midlands, a country which was once, and in the time of Burchell and other old botanical travellers, covered with luxuriant prairie-like grass. The plains had few trees, mainly the *Acacia horrida* and brushwood of various species; while the hilly ranges were covered with bushes and trees, and along the river-courses and smaller feeders various species of Acacias, Willows, &c., luxuriated. This is now the great wool-producing country, and the country which is being changed in the character of its vegetation by overstocking.

There is little of a satisfactory character delineated in regard to the subdivisions of the South-African flora; but, to conclude my introductory remarks, I may further particularise in connection with what I have said, that the western flora is distinct from the eastern in some of its types, and even in specific differentiation, almost to the total extent of the types they have in common. The *Ericæ*, with a few unimportant exceptions, which make the extraordinary development of them in the west even more conspicuous, are all but restricted to a narrow slip in the inner belt of land to which I have referred. The *Restiaceæ* are mainly in the west. On the other hand, the arborescent Aloes and succulent Euphorbias are eastern; *Bignoniaceæ* and *Rubiaceæ* are also mainly eastern. The western flora is a more peculiar and isolated one than the eastern.

The southern belts of land are, as would be expected, a common meeting-ground of the west and east, but of a most distinctly western character. The Karoo is isolated and peculiar on account of its soil and climate, and forms a tract of country over which neither eastern nor western plants travel. The midland region beyond the Sneeuwberg and to the north-east, even considerably into the Free State, is another subdivision; and while it has *Aptosima*, *Peliostoma*,

and the order of the *Pedalineæ*, and other forms of a subtropical character, its general affinities are to the Karoo flora. To the south and in the east we have what may be called the Kaffrarian subdivision, a flora which of necessity has many Natalian and even Abyssinian types, and is, although very distinct in many of its genera from the rest of South Africa, less pure, if I may be allowed the expression, than the peculiar western or Karoidean and older floras.

I have said that the midland province is the great sheep-country. They do not thrive towards the coast in the rich grassy pasturage there. In common parlance the herbage is said to be there sour, "zuurveld," as the Dutch call it, a term which is applied locally to a continuation of the second or inner range in the eastern province, the Zuurberg, on account of the character of the herbage. The pasturage, however, of the midlands is splendidly adapted for sheep; and consequently it is there we find sheep-farming carried on to an extent hurtful to the flora. When first introduced, they fed mainly on the grass; and in a country with its periodical or season-rains, and under a high sun, the family soon began to give way and succumb. Suffruticose plants and, in general, shrubs could alone stand against the sheep and such a climate; and at first, and as long as the grass was prominent, these would enjoy immunity from the sheep. But the grass vanished very rapidly, and the bush and scrub came to be the main resource of the flocks, and the ground was left to them and to obnoxious and poisonous herbs—some Asclepiads, poisonous *Tripteres*, and the intoxicating *Melicæ* (the "dronk" grass of the Dutch colonists).

The climate necessarily became affected. The rainfall came down less certainly and oftener, in the form of thunder-torrents. Side by side with the attacks of the flocks the more subtile and insidious agency of a changing climate came into power. The hardy plants of the Karoo commenced to travel northwards, and added their energies to the extirpating of the indigenous and proper flora of the region; species of *Chrysocoma*, *Pentzia*, and so forth, largely developed in the Karoo, came in; moreover, being of a bitter and nauseous character to the taste, they enjoyed immunity, and were only eaten in circumstances of dire necessity by sheep. Sweet bush, such as Lyciums, vanished before them; and the *veld* has become what is called by the farmers in the course of time, and indeed is now, a "bitter veld," and is rapidly becoming an extension of dreary, scrubby, half-desert Karoo.

Such is the general argument. It may be said, however, by those familiar with the conditions of South-African life,

energies in former times, that the very same tracts of country supported thousands, and even millions, of antelopes, that vast flights of locusts used to devour everything green before them, and still the herbage remained always a grassy one. It must be understood, however, and explained that these animals in such vast numbers were always on the move (migratory), following the rains and the young fresh herbage. The vegetation could not have supported them as persistent occupiers. But then the sheep are; and their course is not a leisurely one or restricted to a small area. On account of the increased poverty of the pasturage, their eating is carried on by and during a limited march all day; and hence they cause more destruction by treading down than even by eating; and hence, too, the country, with a naturally hard ferruginous soil (the production of the wasting dioritic rocks of the region), has even become harder. The rain is no longer allowed to the same extent to soak into the ground, is carried off into the watercourses to a greater degree than formerly, and fails to supply, as it did in the past, the great stand-by of the country, deep perennial fountains. The fountains of the midlands in South Africa have been becoming notoriously weaker every year.

It may be of some interest to give the history of one or two of these plants to which I have generally referred.

The Asclepiad genus *Gomphocarpus*, and especially the species *G. lanceolatus*, is a plant indigenous to the midland region. It is a plant never eaten by the sheep. It has come in consequence to cover extensive tracks of the country. The plant is the only tall bush to be seen in whole flats. There is, in connexion with this fact, a very interesting note to be made. We have one species of locust of a most gaudy banded red and green colour. It does not go in flights, like the destructive species; it is a solitary insect. Nor is it victimised by birds and other enemies; its odour is an effectual protection to it. Trees and large bushes are its nuptial bowers; and with the decrease of these in the region, I am informed by the old observing colonists, it decreased. But through the extension and diffusion of the tall *Gomphocarpus* it has secured conspicuous places to be observed once more, and is rapidly on the increase, and now seems to be the only organism to which the acrid- and viscid-juiced *Gomphocarpus* is of use. It lazily feeds on it, and ultimately buries itself at its roots with the eggs of a future brood.

The *Chrysocoma truncifolia* is the prevailing plant of the veld of late years, and seems to be remarkably suited to the changed climate. It belongs originally to the south-west of

the colony. At first it was eschewed by the sheep; but now they have had to fall back upon it from necessity. It is a hardy plant, and presents a green appearance when everything else is blackened and scorched. In the southern parts of the midlands it now is so solely the resource of the sheep, that the mutton, from the beginning of the year to the end, tastes and smells of it. But it would appear there is to be no rest from change, and no fixedness in the flora of the region, because another invader is beginning to spring up, and the reconnoitrers have already got so far as close upon the Orange River. I refer to the *Elytropappus rhinocerotis*, the Rhemster bush of the colonists, a thoroughly worthless and uneatable shrub, which the sheep seem chary of touching. The time will inevitably come when it will take possession; and I am convinced that before very long it will be a conspicuous plant some hundreds of miles north of its original home in the south-west of the colony.

It would, however, be easy to multiply examples. What is to be done to stem the downward and ruinous course referred to is not very clear. South Africa is, as it has been, an unfortunate country. We have, I am sorry to say, no attempts at acclimatization of any importance. It is for the Government to experiment on the introduction of grasses, and, if possible, attempt to save the richest region (because the great wool-producing region) which the Cape Colony has from becoming a wilderness. Much could be done in this direction and by the construction of collossal dams, to save the country, keep up the deep springs, and, in connexion with them, rear the beginning of forest-lands to modify and increase the rainfalls. This Karoo veld is extending even into the Vaal region, and is a common bush in the lately occupied parts of the diamond-fields, the Crown colony of Griqualand West. It is, wherever it goes, the sure index of a changing climate; and persistent moisture weakens it. Much, therefore, in the direction I have indicated could be done, viz. by the construction of large dams (for which the country is remarkably suited), and the commencement of forest planting to encourage the rainfall and so to weaken the plant as well as directly attack it by an increase of vegetation promoted by increased moisture.

This paper is mainly intended to draw attention to an evil under which we labour in the inland district of the Cape Colony; but one of my purposes in bringing the matter before the Linnean Society is, if possible, to elicit information as to the course the Cape Colony should adopt to keep one of its richest tracts from becoming a desert, or a region of ob-

noxious and poisonous plants. It is certainly a subject of alarm to the country when it is known that a drier season than usual entails poverty and death to an incalculable extent amongst our flocks in South Africa. Some tracts of country are poisoned by the extraordinary increase of the *Tripteris flexuosa ;* and transport riders, with their oxen (our only carrying power), have to travel through certain parts of the country without pausing, on account of the *Melicæ*, grasses which have increased to an extent scarcely to be fancied in the last few years, and on eating which cattle become afflicted with intoxication to an alarming extent.

ON THE CHANGES WHICH FLOCKS AND HERDS UNDERGO FROM EXTERNAL CAUSES.

The following paper was read at the last meeting of members of the Agricultural Society of New South Wales, by Mr. John Stewart, M.L.A.:—

Having been invited to read a paper before the members of this society, I decided to say a few words upon a subject which seems to me in need of more attention than it has yet received from stockowners in general. I refer to the various changes or transformations which stock is capable of undergoing in the way of improvement or deterioration. I think breeders should know, so far as they can know, not only the means by which transformation is effected, but also the extent to which transformation is possible. I presume that not very many are aware of the vast extent to which transformation may in the course of time be carried. Still fewer can be aware of the vast variety of circumstances which concur to modify the conformation, the powers, and susceptibilities of a living being. The transformation by which one species of animals seems to glide by almost imperceptible degrees into another species are, indeed, involved in much obscurity, and I do not presume to imagine that I can throw any light upon them. All that I mean to attempt is to show that the subject is worthy of more attention than is commonly bestowed upon it. It may not at present be possible to discover, or to recognise, all the agents or circumstances which influence the improvement or the deterioration of stock, although we are quite familiar with some. But, by closer attention to what takes place, and by systematic investigation, it is not only possible, but highly probable, that the breeding of stock may in a few

years become a more scientific pursuit than it is at present; and it is not altogether devoid of science even now. If it is to make further progress it seems to me that we should continue to talk about it, to discuss opinions, to make experiments, to collect, arrange, and disseminate facts. Nothing hinders progress so much as a settled conviction that we know all that we need to know. Believe that, and progress, or advance in knowledge, is at an end. There is no further inquiry, no further experiment, no intelligent observation.

Every breeder who knows anything about his business is perfectly aware of the great improvement which may be effected in a flock, or a herd, by a judicious selection of sires and dams. By careful selection of home-grown parents, or by importing something better than the best of the home grown, many of the herds and flocks of this colony have, within a few years, been transformed into stock very much superior, as compared with the stock which they have replaced, since improvement became the order of the day. Especially our sheep and cattle have become much more profitable to their owners than they were a few years ago; and, although the augmented profit is not due altogether to an improvement in the breed, still a good part of it is, perhaps I would be justified in saying a great part. Wool, mutton, and beef might, and, in the altered circumstances of the colony, certainly would have realised more satisfactory prices than formerly, even if no improvement had been made or attempted. But, by the improvement which has already been effected, we have not only a better article to sell, but we have had the article sooner ready for sale. The breeder who has not attempted to improve his stock, or not succeeded, may have done better than formerly, but he has not done so well as the breeder who has managed to make his sheep yield a finer or a heavier fleece, and to be fit for the butcher fully a year sooner. I understand that there are breeders who regard all efforts to improve stock as mere foolishness, and all reported improvement as a sort of delusion, fostered by a wish to be deceived. These gentlemen contend that God made all things very good from the beginning, and that it is little less than impiety for such a creature as man to imagine that he can improve upon the works of the Creator. Any attempt to do so must end in failure. If the stock is changed at all it must be changed for the worse, rendering it more liable to disease, through delicacy of constitution. I do not think it is necessary to refute assertions of this kind. Those who have paid any attention to the subject

are fully convinced that many of our flocks and herds have of late been greatly changed, and changed for the better. And I believe it is never doubted by any one that the change has been effected greatly, if not wholly, either by judicious selection of the sires and dams, or by crossing with improved stock. That like produces like has long been the prime dogma, almost the sole dogma, in the principle of breeding. No improvement is expected, and none I think is purposely attempted except by means of selection or crossing. The results depend a good deal upon the skill of the breeder who makes the selection or chooses the cross; and the requisite skill is acquired for the most part through personal experiences, although some experience is common to all. But even in skilful hands the results do not always realise expectations. The offspring is sometimes, though not often, superior to the parents. More commonly it is inferior, and decidedly inferior. Occasionally it is unaccountably inferior. It may be that in such cases the parents were paired injudiciously. That often happens. The foal produced by a cart mare and an Arab horse is fit neither for the course nor the cart; but he is just what a skilful breeder would expect him to be from such a union. When the offspring is not what a skilful breeder expects, considering the quality of sire and dam, there must be some cause in operation which has not been recognised, or not taken into account; and this happens very often, so often indeed that some breeders, especially breeders of racehorses, entertain an idea that success depends somewhat on good luck. I have no faith myself in luck, either good or bad, and I do not suppose that any man of ordinary capacity has; but undoubtedly a great deal depends upon management, and careful management is not always skilful management; and it may be that even the most skilful breeders have yet something or much to learn.

In this colony flocks and herds, originally excellent, have in more than one case degenerated very considerably in the course of a few years, although no inferior stock had been permitted to mingle with them. On the other hand, both flocks and herds have in no very long periods improved very considerably without either selection or crossing. The sheep first obtained from the Cape of Good Hope were, it is said, of a very inferior quality, coarse-woolled, long-legged, flat-sided—more like goats than sheep; but within a few years they greatly improved in every respect, and before any care was taken to select the breeders or to cross them with a superior breed. From facts of this kind—and many might

be cited—it is manifest that pedigree is not everything. Undoubtedly, the shortest and surest method of producing improved stock—superior cattle, superior sheep, superior horses, pigs, poultry, or dogs—is to select sires and dams that have been improved; and, if such improved stock cannot be obtained, the next best and quickest method is to select for the sires and dams the best of the herds and flocks. But, if they are all alike, if there be none better, none worse, than the rest, selection is of no avail. Frequently, however, if not generally, there are in every herd or flock some one or two, or a few, that are better than the others, perhaps better than all the others. To know how this superiority is acquired is a matter of very great consequence, for it would indicate the path to be pursued when superiority or improvement is desired. If it could be known what it is that renders one or two, or a few members of the flock or herd superior to the rest, then we should in all probability know by what means the whole might be improved. Those who hold that race, or blood, or breed, or pedigree is everything are apt to attribute the superiority to some remote ancestor, whose excellence had been transmitted unseen through a generation, or perhaps more than one generation, of inferior or degenerate descendants. Be it so, possibly the progeny does sometimes more closely resemble a remote than an immediate progenitor, but the question remains unanswered, How, or by what means did *he* acquire his superiority? Before superiority can be transmitted it must be acquired somehow. There must have been some external cause for it. We have abundant proof that no change takes place in anything, living or not living, without a sufficient cause for it, although the cause may long remain unknown. An egg or an acorn would remain an egg or an acorn, and nothing more, for ever, unless acted upon by something external to itself. A stone at rest, or a stone in motion, would remain for ever at rest, or for ever in motion, if no cause moved the one or stopped the other. Flocks and herds continue to propagate facsimiles of themselves for ever, unless there be some change in the circumstances amid which they have existed and propagated for many generations.

However desirable it may be to know the causes, agents, or circumstances which have, singly, or in combination, contributed to change a living being into something better—or it may be into something worse—I fear that such knowledge is not at present attainable to any very satisfactory extent. It must be confessed that we are very much in the dark as to the causes of the various transformations which animals and

plants undergo in various periods of their development; and our knowledge of their transformations, after they come under the dominion of human beings, is far from complete. Of course we are not in a state of utter ignorance on the subject, for it has been long known that any change in the nature of the food, water, air, light, moisture, temperature, and any great change in the habits of the animal, exercise some influence over conformation, size, power, speed, the period of maturity, and other qualities. We know that these, and perhaps some other agents, may be so regulated or administered as to improve stock, or to deteriorate it. When, for example, we meet with a horse superior in size or form to his parents, we are justified in concluding that he was developed under or amid circumstances superior to those in which the sire and dam were reared. Probably he had more food, or a better kind of food; with more food, and freedom to roam about, he would take more exercise, and his organs of locomotion and the auxiliary organs would be more fully developed, and possibly be developed in a shorter period of time. Such a change, and a change for the better, can be traced pretty clearly to its cause, or causes, and it is only one of several or many which can be effected by regulating the life or habits, and supplies of the growing animal. Other changes can be induced by regulating propagation as to ages and seasons. But there are changes or transformations of frequent occurrence, of which we can give no account, or none that is quite satisfactory. We have an immense variety of pigeons, and it is believed by those most competent to judge that all the varieties have come from one common stock, the Rock pigeon. But what it was that transformed the rock pigeon into the tumbler, the carrier, the pouter, or any of the other varieties well known to pigeon fanciers, no one knows exactly or certainly. What it was that made one flock of sheep to have coarse hairy wool and another flock to have fine silky wool is equally unknown. There is, or there once was, in some part of the United States, a breed of short-legged sheep, much prized because they could not jump over the fences then usually employed to confine sheep; but how the original progenitor acquired the short legs no one ever discovered. There is at the Cape of Good Hope, and, I think, in some other places, a breed of sheep whose tails are of such enormous dimensions that they cannot carry them clear of the ground, and require a sort of go-cart to support them; but how the original sire or dam of that breed came by the big tail is a mystery which has never been explained. The hump on the shoulder,

which distinguishes the buffalo from the ox, must have been produced by some cause in a remote ancestor of bovine race, and it has been not only perpetuated through many generations of buffaloes, but transmitted to and through oxen; yet no one knows how the hump was first acquired. We have black-woolled and white-woolled sheep, we have great diversity in the colour of other species of animals, especially among those which have been long domesticated, but we know not what has caused the diversity. Diversity of colour is not usual nor common among animals of the same species while exempt from the interference of man. White or black rabbits produce grey progeny soon after they are turned adrift.

Darwin, the great naturalist, in his profoundly interesting work on the 'Origin of Species,' says that "our ignorance of the laws of variation is profound. Not in one case out of a hundred can we pretend to assign any reason why this or that part differs more or less from the same part in the parents."

If the subject be a mystery to Darwin, and to men of his capacity and assiduity, few may hope to penetrate it; yet Mr. Darwin himself would be one of the last to discourage continued research or investigation. The conclusions at which he arrived as to the origin and transformation of species cost him years of unceasing research and intellectual effort, and it cannot be doubted that he has rendered the work of future naturalists comparatively easy. Anyhow, the bare fact that changes do occur of which we know not the cause should urge us to lose no opportunity of examining and re-examining whatever seems likely to throw any more light upon the subject.

Some persons have an off-hand way of settling all difficulties of this kind; and they often hinder rather than aid inquiry. Every deviation from the ordinary standard they call a freak of nature, and seem to think that they have satisfactorily explained the whole matter when they have given the novelty a name. But they are wrong. To tell us that a buffalo's hump is a freak of nature is to tell us no more than we knew before. If we could be told what purpose the hump serves, what function it performs, or under what conditions it is acquired, we should certainly be somewhat more enlightened than we can possibly be by getting a fine name for it. If it could be shown that the hump is a reservoir of superfluous nutriment stored up in a time of abundant food, to be available in a time of famine, we could then see the utility of the hump. If it could further be shown that the conditions under which

the buffalo had been developed had rendered the top of the shoulder a more convenient location than the inside of the belly for storing up superfluous nutriment, we should then know not all perhaps that might be known about the hump, but more than we know at present. To know precisely what are the circumstances which render the shoulder or wither the most eligible situation for a reservoir of nutriment would probably complete our knowledge of the subject. We should then know what to do to insure the transformation we desire, that is, when the circumstances are as controllable as the stock.

Though transformation, variation, modification, or change, in animals or plants cannot be always accounted for or explained, yet we know it must be caused by something external to themselves, and independent of pedigree or descent, breed or race. As I have said already, we are fully aware of the influence exercised by some of the external things; but there are some unknown, or there may be some combinations of the known, far more influential than we are aware of. There are species of animals and plants which seem to be immutable. For thousands of years they have been precisely what they are now; but the external things by which they were surrounded have, to all appearance, been as unchangeable as the organic beings themselves. In a previous period of their history the animals may have undergone much transformation, until they became well adapted for existing among the things about them, when further change may remain in abeyance. In the wild state, the size, the nature, the powers, the susceptibilities, even the colour of the animals, are determined by external things acting uniformly for long periods of time. Hence it is that by the time man comes to see them, all the animals of the same species are pretty uniformly the same at the same age, even to the colour or the plumage. They are in general so much alike that, except for age or sex, it is seldom easy to distinguish one from another. But the moment any change takes place in external circumstances, transformation of some kind, and to some extent, begins. When man lays his hand upon the wild animal, and places him under his control, he very soon makes that animal a different being. In a few days he may transform a wild horse into a tame one, or, it may be, into an untameable horse. By a difference in the treatment the same animal may be rendered obedient or intractable, harmless or dangerous, sullen or cheerful, ready or dilatory, timid or imperturbable, affectionate or spiteful. In

either case the horse is no longer the same being that he was when wild and free. But besides these changes, which may be called moral transformations, effected in a short time, and more or less transitory, there are others possible, requiring more time, of a more material character, and more durable.

Let us imagine a change of external circumstances, not at all impossible, to an animal long known to us. The Arab horse of the present day has descended from a long line of ancestors, free from all foreign mixture, and each generation subject to very nearly or quite the same external influences. The race has been so long isolated from foreign intercourse that the peculiar qualities may be regarded as fixed or permanent, compared with those which have resulted from intercourse with a different breed. I think it would be quite possible for the Arab horse to undergo a great change, a complete transformation, simply by placing him amid circumstances quite unlike those to which he and his ancestors had been long accustomed; and yet the breed might remain perfectly pure, free from all mixture with a different breed.

Transport a stud of pure Arabs to an island where intermixture would be impossible; where, instead of vast, arid plain, scantily grassed, there were lofty mountains, deep and moist valleys; where, instead of almost perpetual sunshine, there were fogs and sleet, severe winters, and moist summers; where there were no enemies to keep them constantly on the alert, no human being to regulate or molest them. Leave them amidst these altered circumstances for a time, I shall not say how long, for it might require some thousands of years to effect all the transformations which such a change would produce. If their history could be told from the time of their transportation, it would be found that many prematurely perished, and that all had suffered more or less from privation and from disease. For some years the deaths would be more numerous than the births, and many would die before reaching maturity. After a time, however, the numbers would begin to increase, and continue to increase till there would not be grain enough to maintain the whole in strength and vigour, when the numbers again would begin to decrease. Winters of more than ordinary severity would carry off the feeble, the aged, and the lame, till the number of annual births would be about equal to the annual deaths. By or before the time that their history had gone so far, these animals would be so completely transformed that they would have very little resemblance to the stock from which they had descended. They would be more like to

Highland, Shetland, or Timor ponies than to Arab horses. By the time they became ponies they would be prolific, hardy, better fitted to thrive on the herbage of the island, and to endure the cold and privations of winter, than the Arab stock from which they came. But they would be less teachable, less easy to domesticate, and scarcely one man in a thousand would be able to inspire them with confidence in, or affection for, human beings such as the Arab horse and domesticated dog frequently exhibit. Let us, however, indulge in a little more supposition on this point. Let us imagine another change in the external circumstances of these Arab horses transformed into Timor ponies. Let us put them on shipboard to undergo a long voyage. To catch a wild pony, to put him on board a ship, and to carry him over thousands of miles of water, is a thing which cannot be done without making him something different from what he was. You deprive him of the food to which he has been always accustomed; you deprive him of his liberty to roam about; you deprive him of the pure air which he and his ancestors had enjoyed continually through generations unnumbered; you deprive him of the society which he loved; you mate him with strangers, who are disagreeable to him; you withhold that for which he longs, and you force upon him that which he dislikes. In a word, you make the poor wretch miserable, although you may all the time wish to comfort him. Some of the animals thus used are so sorely depressed that life becomes a burden to them, and they make no effort to live. They submit to everything, and resist nothing. These for the most part die, and die broken-hearted. Some suffer under diseases which never occur among horses living in the open air. All become feeble or incapable of much exertion. When landed, after long confinement on shipboard, they can travel but a short distance at a slow pace, and for them to carry a rider is out of the question. I fear that these changes are but too little considered by those who have to do with the shipment of horses or other live stock, and it is certain that they are rarely anticipated by exporters from this colony.

These changes may seem to be insignificant, being for the most part only of temporary duration, and in no perceptible degree affecting the structure or conformation of the animal. But they are not so insignificant as they seem. It is true that they are but temporary, and that, under judicious treatment, the animals, at least those which survive, soon recover health, vigour, and strength. But if they are temporary, it is only because the causes which produce them are of tem-

porary duration. If you could get these ponies to breed while on shipboard, and keep them there for a few thousand years, the transformations which occur in a few weeks would be succeeded by others more remarkable and more durable. Among other changes, the legs would get shorter, the neck and the head would get shorter, and the front teeth, by which the horse gathers grass, would either disappear or undergo some considerable modification. The Arab horse acquired his long legs from his wandering habits in search of food and water, and, perhaps, from the necessity of escaping from enemies. For an animal that feeds as he walks, and feeds off grass, long legs render length of head and neck a necessity. I think it is the general, if not the universal opinion of naturalists, that at least a very large number of the changes which animals undergo in structure and form are changes which render the animal better fitted to cope with and exist among the circumstances in which he is placed. It is certain that some portions of the whole structure are changed, that they undergo alteration in length or breadth or capacity according to the circumstances in which they are born and reared. A breed of horses confined for generations to a small paddock always luxuriantly grassed would become large, fleshy and slow, taking more after the nature of a cow or a bullock than the Arab horse. Having no motive or no inducement to take much exercise at a rapid pace, the muscles and the organs which supply them with vital energy would in the course of time undergo a change of form, of size, of power, and of action. The Chinese have a breed of sheep much larger than ours and more prolific, and it is easy to guess by what means they have been transformed into what they are. By supplying them with abundance of nourishing food from birth to maturity, and by relieving them from the labour of gathering their food, the lambs grew rapidly, and they grew larger than the parents. This change or improvement thus affected would be transmitted to the next generation, and to the next again, with a still stronger tendency to make the most of external things, such as there prevailed. But if these large sheep were brought here, and subject to the same treatment which ours receive in the open bush, very many would perish, unable to endure the labour of collecting so much food as they had been long accustomed to receive. Such of them as survived would, in the course of time, produce lambs of a hardy kind and reduced size, better able to travel, better able to gather their own food, and better able to stand the climate and the privations to which our sheep are subject. But by the time

these Chinese sheep were thoroughly acclimatised, they would have undergone transformations which would render them much more like to our own sheep than to their Chinese ancestors.

The varying colour of the skin in the human being is an interesting instance of transformation for the better under the influence of external causes. It was long supposed that the first pair of human beings had white skin, but according to modern philosophy that would depend altogether upon the locality in which human beings first made their appearance; and, taking all things into consideration, it seems most probable that the first pair were very dark, if not quite black. Under a tropical sun a black skin is, in more ways than one, better than a white skin. But for all that white parents will beget white children. If the children are not exposed to the full power of the sun they remain white; if, on the contrary, they have to endure severe sunshine continually, they must suffer great inconvenience, or the skin must become dark. If weak, infirm, delicate, if insufficiently nourished, the children may not have vitality enough to acquire the dark skin. Such for the most part will die in infancy. Only those survive who have strength enough to face the sun and darken the skin. Thus in time all become black where the sun is hottest.

If the parents be one black and one white the children will be darker than the one, yet lighter than the other, thus showing very clearly that the progeny is a compound of the two parents, not a facsimile of either. Whether this half-caste breed will become darker or lighter will depend altogether upon the circumstances in which they are born and reared. They may pair with other half-castes, and in that case their children will have the same colour as the parents; or they may pair with whites, in which case their children will be fairer than themselves; or they may pair with blacks, in which case the children will, of course, be darker than the half-caste parent. So far, the skin, be it dark or fair, is inherited; but it must first have been acquired before it would be transmitted. Even after it has been acquired it is subject to modification or change, according to the nature of external influences. The child of a black African by a white European will be darker or fairer according to the life it leads. If exposed to the sun, as its mother and her ancestors were, it will get darker as it gets older; if protected by being clothed or sheltered under roof it will become fairer. It may be thought that a change in the colour of the skin involves no change of structure. Comparative anatomists, however, are of a different opinion. On careful dissection

the skin of the black is found to contain a layer not always discoverable in the skin of the white, and it is this extra or thickened layer which gives the colour. If it act as a defence against the solar rays, and be developed by exposure, it becomes a superfluity in some parts of the world, and gradually shrinks or disappears. There are other portions of organic beings subject to the same law; indeed, there is probably no part exempt; parts not required, or not used, disappear, or become useless. A joint may be obliterated in the limb of any animal by fixing it for a length of time, so that no motion can take place in it. An arm or a leg thrown out of use will shrivel up and waste away. On the other hand, use favours development, and especially when the animal is still growing. This law is not confined in its operation merely to the physical structure. As might be expected, it embraces within its jurisdiction not merely all the parts which can be weighed, or measured, or scanned, but also those vital faculties and phenomena by which the living are distinguished from the dead. The child would never try to speak if it never heard others speak, and, not trying, it would never learn. Those who are born deaf are always mute. It is impossible for any one to imitate vocal sounds till the sounds have been heard. The senses are all cultivated by use, and all more or less impaired by disuse; so are the muscular powers; so are the mental faculties; so is mechanical dexterity. States of the mind bordering upon imbecility, ferocity, or lunacy, may be induced through a course of reading. Even the emotions, hopes, fears, hates, affections, reason, and what we call instincts, are subject to the same law. The science of education so far as it is a science, and whether applied to man or the lower animals, is only the art of urging faculties or powers into frequent and systematic use. It is only by efforts to speak, repeated over and over again, that distinct articulation is acquired, and while being acquired the organs concerned, the muscles, the nerves, the vocal apparatus, undergo development fitting each to perform its own part promptly, precisely, and in concert with each other.

The transformations which animals have undergone while in a state of nature are very confidently supposed to have been far more extensive than any of those changes which are exhibited among flocks and herds under the rule of man. From the recent researches of the most eminent modern naturalists it is manifest, almost beyond denial, that the various living beings with which we are more or less familiar in various localities of land and water have descended from

beings to which they have no resemblance. The old theory, that the world was originally and instantaneously stocked with fac-similes of the animals and plants which now exist, is no longer tenable. Under the light which modern naturalists have thrown upon the history of creation, we have now evidence, which we had not always, that this earth has existed for a much longer period than we had imagined, and that it has been the scene of transformations such as our forefathers never imagined. I have no time, nor am I competent, to go into the details of this evidence; it is, however, accessible to any who can read the English language; and I need only say that it is founded chiefly upon geological data, sifted and verified by men of distinguished ability, who have spent their lives in tracing out the course of geological formation and of natural history. They testify that for a very long time this world contained no living being, either animal or vegetable; that life, when it did come, originated in the waters; that the first forms of life were minute in size, and simple in structure; that the minute and simple were very gradually transformed into complex and gigantic; that herbage had arisen and spread abroad long before there were any herbivorous animals; that, at least on the land, herbivorous animals preceded the carnivorous; that the earth itself, and every species of animal and plant, have undergone innumerable changes, each for the most part so gradual that man's sojourn here has been scarcely long enough to note the difference. Thousands of thousands, millions of millions, of years this earth may have rolled round the sun, while some lowly plant was in course of transformation into a gigantic tree, such as the cedar or the oak. In all probability a still longer period elapsed before a living being so gifted and so complex as the horse was transformed from the organic mite in which his race originated.

There are many people to whom such vast transformations are utterly incredible; but they are incredulous simply because they are uninformed or misinformed. They not only refused to believe Galileo when he said that it was the earth, and not the sun, which revolved, but they threatened to make away with him for telling them such a preposterous fable. There was a time, and not very long ago, when it would have been impossible to make any man believe that a message would be sent round the world in an hour or two, or even in a year. There was a time when it would have been impossible to make any man believe that a few heaps of coal and stone could be transformed into machinery which would carry ever so many tons, and ever so many hundreds of human beings, from

place to place with perfect safety, at the rate of fifty or sixty miles an hour. Yet these seemingly impossible things have become accomplished facts within a very few years. Who, then, shall say that anything is impossible in the great workshop of nature, patiently plodding on through countless millions of years?

After all, the transformations which have taken place in the organic kingdom, in the course of vast periods of time, are not more truly wonderful than many which take place in our own presence, and of which we see the beginning and the end. Many things take place about us so incredible that not every one would believe them on the testimony of others. I suppose no one can be quite so ignorant as not to know how chickens come into existence. Yet it might be possible to find an intelligent human being profoundly ignorant on this particular part of natural history. Tell him of the transformations which a hen's egg undergoes in the course of incubation — very likely he would find it hard to believe that a shellful of white and yellow pulp, shapeless and lifeless, could be transformed into a living animal, gifted with double organs of locomotion, and able to flee through the air or to move on the land. Probably he would deny the possibility of transforming such a compound of shell and jelly into a sparrow or an eagle; and when told that nothing but a gentle heat applied for a given number of days was all that the egg required to convert it into a chicken, he would pronounce the whole story a preposterous fable, the means inadequate, and the result impossible.

There is another kind of transformation daily going on in our presence unheeded, and yet quite as wonderful as any that are reported in the history of creation. The transformation of grass in the stomach of the horse, first into chyle and thence into blood, does not appear to be a very wonderful change, although it is so, all things considered; but the transformation of blood into bone, muscle, fat, hoofs, teeth, hair, is as truly wonderful and as total a transformation as any that occurs in animated nature. To ordinary eyes there is nothing in the blood which would lead us to believe that it could be transformed into so many different structures, many of which have not the slightest resemblance to blood. Yet every particle of a breathing animal, large or small, mouse or elephant, is nothing but blood transformed, and the blood itself is only grass transformed.

In what forms our flocks and herds existed before they became sheep, cattle, and horses, I do not know, and some may think that it is needless to inquire. But I am disposed

to believe that the man who makes the rearing of stock a scientific, as well as profitable pursuit, cannot know too much about them and their antecedents. Everything which helped to make them what they are, everything which helped to make them what they should be, or should not be, must be known before we can be sure of making them, or of keeping them, what we want them to be. So much can be known only by learning the circumstances amid which the animals have changed from bad to good, from good to better, or from bad to worse. Indifference to the causes which effect any change is equivalent to leaving them untended or uncontrolled.

Although the course of transformation cannot be traced for any great distance along unbroken lines, still we see enough clearly, and we see much dimly, to justify an inference that the limits of transformation are scarcely ever reached. Whilst a race of animals exist there is no saying what changes it may undergo. We know of no animal, nor of any plant, which is quite unchangeable. We know, as a matter of experience, that it requires some management to prevent change. We are all familiar with what is called superior stock, which is stock that has been transformed, changed from inferior to superior, and we all know that such stock will degenerate under mismanagement or neglect into inferior stock, which is also transformed stock. It is true that we see no change in which likeness to the parents is altogether obliterated, and it is not supposed that one species is ever transformed into another. It is not alleged that any change of circumstance ever transformed a horse into an ox, or an ox into a horse. Nothing like that. It is, however, alleged that the germs of life were originally so plastic that the nature of the remote issue depended upon the conditions under which they existed and propagated. It may be that the horse has descended from a germ similar to that from which the ox has descended. That which in one case ultimately became a fish might, under a different set of circumstances, have become a bird or a beast. If life, either animal or vegetable, originated in a mere cell, a germ, or atom, on any one point of the earth's surface, whether in the water or on the land, it must almost inevitably have originated in more than one or two localities. If the circumstances which modify a vital germ had been precisely the same all over the world, we should have had at this time only one species of animals and one species of plants. If the modern theory of creation be the truth, we have great variety of animals and great variety of plants, simply because the vital germs from

which they have descended came into being in various parts of the world, and existed, and propagated, amid a great variety of circumstances.

I should like to refer, though very briefly, to a passage in Sir Charles Lyell's admirable work on the 'Antiquity of Man,' in which that distinguished naturalist and philosopher compares the transformations of organic life with the transformations of language. Both language and life originated long ages before there was any human understanding to note their advent; both had undergone innumerable transformations long long before either pen could record or tongue could tell the past from the present; both were simple, small, feeble, variable, and insignificant, through a vast number of generations; both have descended to us, so transformed, that they cannot be traced back to the remote and actual progenitors; with both, the transformations have been caused by agents, of which some are only surmised, while others are obvious; both have been comparatively immutable for long periods, while the circumstances amid which they existed were unchanged; both have been changed by intermixture, the one with foreign words, the other by foreign blood; both have dropped some of their parts by disuse, and both have had some parts extra developed by extra use. Both have wandered from place to place, and become different by the change of locality; and it may be that in some cases both have come to an end, or ceased to exist, leaving only their fossilized remains. Both life and language seem, however, to be endowed with perpetual succession, although the most general opinion is that some languages, and some species of animals, have become extinct. Sir Charles Lyell says that no language seems ever to have lasted for a thousand years, while many a species of animal seems to have lasted for hundreds of thousands. But, unless I am mistaken, there are philosophers who dispute this assertion. It is a question with some, whether the living languages and the living species have not, in point of fact, descended from those which seem to be extinct. We hold them extinct because there are none now in existence that resemble them. But we cannot be sure that resemblance has not been lost in the course of gradual transformations. The languages once spoken in Greece and Rome about two thousand years ago are usually regarded as dead or extinct, although Sir Charles Lyell has shown pretty clearly that they are not so completely extinguished as most people suppose. In fact, they are not at all extinct, though they have been so greatly transformed that they have no obvious resemblance to their

fossilized parents. The inhabitants who now occupy Greece no longer speak the language that was spoken there two thousand years ago; and no ordinary Englishman can comprehend the language that was spoken in England one thousand years ago; yet the English of the present day has undoubtedly descended to us from that which was then spoken. Neither the old English nor the older Greek has become extinct; but both have been gradually transformed, the one into modern Greek, the other into modern English. The language of the ancient Romans has undergone transformations as great, and much more various, because it has been mixed with a greater variety of other languages. By intermixtures and from other causes, it has been transformed into what we now call Italian, Spanish, Portugese, French, Wallachian, and other dialects, which all bear some resemblance to each other, and to the Roman mixture, while each preserves some resemblance, faint though it be, to that which prevailed before the Roman cross was introduced. In a similar manner the fossils of the organic world which seem to have belonged to a race no longer in existence may, upon further inquiry, be found to have been the actual progenitors of beings now alive, though now so much transformed that the connection between them is far from obvious. It is, however, unnecessary to pursue this subject further. Enough has been said to show the striking analogy which seems to exist between the transformations of living things and the transformations of living languages. The history of the one reflects some light upon the history of the other.

I must now conclude. If it be thought that this paper is too long I may fairly plead that the subject is one which cannot be explored, even superficially, in an hour or two. It is somewhat like a newly discovered territory containing multitudes of novelties, each of which must be patiently examined before we can know all that is worth knowing. At present we have just commenced the survey of this new field of inquiry, and have learned to understand but a few of the many wondrous things which lie within its boundaries; but surely enough is known to convince us that we may and should know more. If it be true that every living thing from its origin to its mature development is liable to undergo changes of various kinds, either for the better or the worse, and from causes or circumstances external to itself, we ought not to rest content while we remain in ignorance or in doubt concerning any of the circumstances which contribute to the change. It may be that individual efforts to throw more light on the subject may not be produc-

tive of any very important results; yet they can hardly be altogether unproductive. But, in a colony like this, we ought to have a school or college in which the breeding and rearing of flocks and herds would be systematically studied, and systematically taught, along with the proper management or treatment of all kinds of stock in health, and in the various ailments and injuries to which they are liable. I think this society could very easily, and very properly, establish such an institution. In the mean time no one who takes any interest in the welfare of this colony need ever regret taking any steps towards rendering the breeding and rearing of stock a scientific pursuit, requiring a much more extended knowledge of the changes which our flocks and herds undergo from external causes, than is at present commonly brought to bear upon the subject. Already the most successful breeders are those who are the most studious and intelligent.—*Sydney Mail.*

ANALYSES OF EWE AND GOAT'S MILK.

By Dr. Stevenson Macadam, F.R.S.E., Lecturer on Chemistry, &c.

At the annual general meeting of the Gala Water Farmers' Club, held in the Town Hall, Stow, on Friday, May 1st, Dr. Stevenson Macadam gave an address on "Chemistry in connection with Agriculture," in the course of which he made the following remarks on the composition of ewe and goat milk:—

The nourishing properties of the various natural and artificial feeding stuffs must not only have an important bearing upon the sustenance, growth, and fattening of stock, but also on the quality of the milk yielded by cattle and sheep grazing on different pastures, and feeding on various artificial materials. Every agriculturist knows that there are certain fields where the sheep and lambs thrive better than on other fields; and such difference in the respective sustaining powers of the fields must be ascribed, in great part at least, to the respective qualities of the pastures in these fields—directly available in the grass, and indirectly available in the milk. Through the kind co-operation of my friend Mr. Lyall, of Caddonlee, I have been able to obtain five samples of ewe milk taken direct from the udders of five ewes placed under somewhat different circumstances; and having analysed these samples, I have now the opportunity of giving you the detailed results. I may mention that No. 1

ewe was newly lambed, and had been fed on turnips and second year's grass; No. 2 ewe was fed on second year's grass; No. 3 ewe was on first year's grass; No. 4 ewe was also on first year's grass, but in a different field; and No. 5 ewe was feeding on old pasture, probably 100 years old. Nos. 2, 3, 4, and 5 had been lambed for two to three weeks. The following table gives the principal results of the analyses of these samples of milk:—

Analysis of Ewe's Milk.

No. of ewe.	Specific gravity of milk.	Cream per cent. by volume.	Total solids per cent. by weight.	Solids not fat per cent. by weight.	Fat in solids per cent. by weight.	Ash in solids per cent. by weight.
1. Time of lambing...	1032·0	30	25·14	13·52	11·62	0·96
2. Two to three weeks lambed.....	1043·9	11	16·83	13·29	3·54	0·92
3. do. do...	1036·2	20	19·83	12·41	7·42	0·98
4. do. do...	1038·5	12	15·91	12·04	3·87	0·91
5. do. do...	1027·9	22	18·55	10·48	8·07	0·94
Mean of all trials	1025·7	19	19·25	12·35	6·90	0·94
Mean of milk from Nos. 2, 3, 4, and 5 Ewes, and excluding No. 1 Ewe, being newly lambed	1036·6	16	17·78	12·06	5·72	0·94

It will thus be observed that the ewe milk taken at the time of lambing was extremely rich in solids and fat, and the milk taken from two to three weeks old varied much in quality. Indeed, excluding No. 1 ewe milk, which, being at the time of lambing, must be regarded as exceptionally high, the other samples of ewe milk ranged in specific gravity from 1027·9 to 1043·9; cream, from 11 to 22 per cent.; total solids, from 15·91 to 19·83 per cent.; solids not fat, from 10·48 to 13·29 per cent.; fat in solids, from 3·54 to 8·07 per cent.; and ash in solids, from 0·91 to 0·98 per cent.; whilst the average of the milks from Nos. 2, 3, 4, and 5 ewes gave specific gravity, 1036·6; cream, 16 per cent.; total solids, 17·78; solids not fat, 12·06; fat, 5·72; and ash, 0·94. I am quite aware that the milk of a single ewe taken from each field must not be held as representing exactly the relative average composition of the milk from the whole or even from a score

of the sheep in the respective fields; but taking the results of the analyses of the milks yielded by the ewes at Caddonlee, there can be no doubt that the milk of one ewe differs in quality, and probably also in quantity, from the milk of other ewes grazing on the same farm and even in the same field. [Immediately after the address, Mr. Lyall, of Caddonlee, stated that probably part of the difference between the quality of the milks yielded by Nos. 3 and 4 ewes, which were both fed on first year's grass, might be due to the fact that No. 3 ewe grazed in a field which had the advantage of facing the south, and where the grass was more succulent and luxuriant, whilst No. 4 ewe grazed in a field lying to the north, and where the grass was not so succulent.]

The variation in the quality of ewe's milk is quite in keeping with the variations observed in the quality of cow's milk, as may be noticed from the following table, which gives the results of a large number of analyses of cow's milk taken from four dairies which supply milk to Edinburgh :—

Average.	Specific gravity of milk.	Cream per cent. by volume.	Total solids per cent. by weight.	Solids not fat per cent. by weight.	Fat in solids per cent. by weight.	Ash in solids per cent. by weight.
Dairy						
A. Morning milk	1031·46	7½	11·827	9·395	2·432	0·70
B. „ „	1032·14	8	11·95	9·50	2·453	0·69
C. „ „	1033·0	8	12·36	9·91	2·45	0·69
C. Forenoon milk	1032·3	10	13·54	10·41	3·13	0·73
D. Morning milk	1033·5	6¼	11·23	9·36	1·87	0·71
D. Forenoon milk	1031·4	8½	12·58	9·74	2·84	0·71
D. Afternoon milk	1030·8	9	12·43	9·52	2·91	0·72
Average of four dairies, representing forty-six cows and 66 samples of milk	1032·1	8¼	12·27	9·69	2·58	0·71
Differences in quality of milk, including all trials, but excluding partial runnings—						
Lowest.....	1028·3	5	10·57	8·62	1·56	0·62
Highest	1035·7	11	14·54	11·23	3·47	0·76
Difference.....	7·4	6	3·97	2·61	1·91	0·14

I have likewise examined, during the last month, five samples of goat milk—No. 1 sample was that taken from a goat—half-bred Egyptian—which had newly kidded; No. 2 sample was from the same goat on the day after kidding; No. 3 sample from the same goat during four days thereafter; No. 4 sample from the same goat on the seventh day; and No. 5 sample was taken from another goat where the milk was three weeks old. The results of the analyses of these milks were as follows:—

No. of samples.	Total solids per cent. by weight.	Solids not fat per cent. by weight.	Fat in solids per cent. by weight.	Ash in solids per cent. by weight.
No. 1 goat milk	29·28	21·52	7·76	1·18
No. 2 „ „	19·42	13·58	5·84	0·97
No. 3 „ „	18·26	12·51	5·75	0·96
No. 4 „ „	16·18	11·52	4·66	0·92
No. 5 „ „	13·43	9·12	4·31	0·73
Mean of all trials.....	19·31	13·65	5·66	0·95
Mean of Nos. 2, 3, 4, and 5, samples, excluding No. 1, being from goat newly kidded.....	16·82	11·68	5·14	0·89

The specific gravity and cream could only be conveniently taken in the case of No. 4 sample, where the specific gravity was found to be 1033·9, and the cream 13 per cent. by volume. The analyses demonstrate that when the goat drops the kid, the milk is extremely rich, and that the quality comes down day by day, till in three weeks it resembles, in composition, very rich cow's milk. It may be instructive to contrast side by side the quality of average cow's milk, average three weeks' old ewe milk, and three weeks' old goat milk, and the following table will enable us to do so:—

	Average cow's milk.	Average 3 weeks' old ewe milk.	3 Weeks' old goat milk.
Total solids per cent. by weight	12·27	17·78	13·43
Solids not fat	9·69	12·06	9·12
Fat in solids	2·58	5·72	4·31
Ash in solids	0·71	0·94	0·73

It will thus be observed that goat milk is richer than cow milk, especially in fat, and that ewe milk is decidedly richer

than either goat or cow milk on all points. It is probable that a knowledge of this fact may lead to the use of ewe milk by invalids and others desirous of having very rich milk as an article of diet.

ON THE SEAT OF DECOMPOSITION OF ALBUMIN AND OTHER NUTRIMENTS IN THE ANIMAL ORGANISM.

By F. Hoppe-Seyler ('Pflüger's Archiv,' vii, 399—428).

The chief object of this paper is to confute Voit's opinions regarding "organ albumin" and "circulating albumin" (*vide* this Journal, 1873, p. 285), and to show that the consumption of albuminous matters in the organism takes place in the living cells of the tissues, and not in the lymph in which they are bathed, as supposed by Voit, or in the blood itself, as believed by Lehmann, Frerichs, Bidder, and Schmidt. The consumption of albumin may be effected by oxidation or by decomposition by ferments. The lymph contains no oxygen, and therefore oxidation cannot occur in it. The author has already shown that the blood containing oxygen has by itself no greater oxidising power than the oxygen of atmospheric air, and rapid oxidation goes on only when living tissues are also present. For example, Scheremetjewski found that when an alkaline lactate was mixed with blood it did not undergo oxidation, but when the blood containing it was artificially made to circulate through the vessels of an excised but still living organ, oxygen was rapidly taken up, and carbonic anhydride evolved. This shows that the blood has no special power of oxidation, but that the tissues have it, and the theoretical objection to this view in the doubt expressed by Ludwig and Worm Müller that oxygen does not diffuse through the capillaries to the tissues, has been removed by the experiments of Pflüger and his pupils, Wolffberg and Strassburg (*vide* 'Pflüger's Archiv,' vi, 44).

There is no ground for supposing that any decomposition of albumin by ferments takes place either in the blood or in the lymph, for hitherto only a diastatic ferment has been discovered by Hensen in chyle and blood, and by Tiegel in blood-corpuscles. Hoppe-Seyler himself examined several litres of chyle, and found a small quantity of diastatic ferment, but no pepsin, and no ferment which could digest albumin or split up fat. Peptones were present in it, but they had doubtless been absorbed from the intestine. Tissue-change therefore does not take place in the blood or lymph,

That it does occur in living cells, both by means of fermentation and oxidation, is indicated by several facts. Albuminous substances, lecithin, and cholesterin are to be found in all animal and vegetable cells which are capable of development, and carbohydrates, such as cellulose, sugar, and glycogen, play an important part in their development. Glycogen, cholesterin, lecithin, and nuclein are also to be found in growing pathological cells. The correspondence between vegetable and animal cells, though close, is not altogether complete. Albuminous substances belonging to the globulin class are found in them all, but those of vegetable origin are more closely allied to vitellin, and those of animal origin to myosin. There is almost no glycogen in chyle or blood, and only traces of lecithin in chyle. These substances, therefore, as well as nuclein, must be formed in the cells. The cells of the liver and muscles can form glycogen from different materials, as sugar, gelatin, or albumin. The production of young cells, however, depends on the supply of nutriment, and whenever nutriment is abundant they multiply. They require a certain quantity of albumin for their production, also cholesterin and lecithin, which is formed from it. They also need glycogen, and if this is not supplied to them by other substances, such as gelatin or sugar, they must destroy a certain quantity of albumin to obtain it. Gelatin or sugar will therefore lessen the consumption of albumin. The activity and development of young cells depend on the local conditions which affect them. The young cells which form pus are not produced for the express purpose of being thrown off, but under other conditions would have had quite a different development. The loss of strength and amyloid degeneration caused by suppuration is due, not to loss of albumin in the pus, but to the want of new cells in their proper place.

Fully developed muscles, glands, and nerves also are not to be considered as mere machines which consume dead material constantly conveyed to them by means of diffusion. The products of their activity are derived from albumin and lecithin, which do not diffuse, and it is therefore more probable that they decompose their own substance and are replaced by fresh cells when worn out. The author considers that the cells of the intestine transform acid albumin and peptones into serum-albumin and fibrin, which pass into the chyle, and therefore regards the chyle as the secretion of the intestinal epithelial cells. He thinks it very difficult to decide how oxidation takes place in cells, or whether reducing bodies are formed in them which combine with ordinary

oxygen brought to them by diffusion, or whether oxygen is converted in them into ozone. He rather inclines to the latter view.—*Journal of the Chemical Society.*

COLOURING OF BONES THROUGH MADDER FEEDING.

By H. Weiske ('Landwirth. Versuchs-Stat.,' xvi, 412—414).

Rabbits of various ages, from six weeks to six months, were fed with bran mixed with 5 per cent. of powdered madder, and their bones were examined with regard to their colour after different periods of such feeding. The colouring was found to begin first, in the older animals, at the point of ossification of the intermediate cartilage of the femur; it was faintly visible after three days, and extended gradually along the walls of the central cavity of the bones and in a layer under the periosteum. The reddening always extended farther towards the middle of the diaphysis in the walls of the central cavity than in the layer under the periosteum, and was darker in the older animals than in the younger. The dung of the animals, which was coloured red after one day's madder feeding, continued so for many days after the madder was stopped. The bones of a rabbit which had received madder for thirty-four days and had then been fed on unmixed bran for fourteen days, were as much coloured as those of an animal killed at the end of the thirty-four days; after twenty-eight days' cessation of the madder the colour had but slightly gone; the time of total disappearance of the colour was not observed. A section of the femur or tibia taken near the end of the diaphysis showed that the whole of the osseous tissue was coloured, but not the intercellular matters. Nearer the middle of the diaphysis, three parallel concentric layers were visible, the two outer ones coloured, and the middle one colourless; the colouring did not extend to the middle of the diaphysis. The cartilage left on treating coloured bones with dilute hydrochloric acid was still coloured, whilst the calcium phosphate precipitated from the acid solution showed no trace of colour, indicating that the colouring matter is fixed by the organic matter of the bones.—*Journal of the Chemical Society.*

ON ABSORPTIOMETRY: ITS APPLICATION TO THE CONDITION OF CARBONIC ANHYDRIDE IN BLOOD.

By S. Setschenow ('Pflüger's Archiv,' viii, 1—39).

In the first part of this paper the author describes his absorptiometer and several experiments with solutions of sodium carbonate and carbonic anhydride. He considers that Fernet's law is perfectly correct, but it leaves the conditions of temperature and the concentration of the liquid during the process of formation of bicarbonate out of account. Supposing that the chemical combination of carbonic anhydride with sodium carbonate remains at the stage of bicarbonate at all pressures, Fernet's law should be formulated thus:—The total quantities of carbonic anhydride absorbed by solutions of sodium carbonate independently of the temperature of the liquid, depend on (*a*) the absolute amount of the substance entering into chemical combination in regard to its conversion into bicarbonate; (*b*) the absolute quantity of salt solution; and (*c*) the degree of solution of the carbonic anhydride in the latter.

The distribution of the carbonic anhydride between the substance combining with it chemically and the solution dissolving it depends both on the pressure of the carbonic anhydride and on the concentration of the solution. If the pressure gradually diminishes while the concentration remains the same, the quantity of the (independently of pressure) chemically combined carbonic anhydride finally diminishes also; if the reverse occurs while the pressure is constant and the concentration of the solution diminishes, the chemically combined carbonic anhydride also diminishes.

In the second part of his paper the author comes to the following conclusions:—(*a*) That the chemical affinities of living blood are not nearly satisfied by the carbonic anhydride present in it. (*b*) The chemical combination of carbonic anhydride by solutions of hæmoglobin within the observed limits depends on the pressure; it is, however, associated with a decomposition of the combining substance, whereby new chemical affinities appear in the latter. (*c*) The changes in reference to the absorption of carbonic anhydride which are brought about by solution of the blood-corpuscles depend on two opposite factors—on a diminution of the amount of chemical absorption in consequence of a diminution in the concentration of the solution of hæmoglobin, and on an increased absorption in consequence of an increase in the

decomposing surface of the hæmoglobin. The first factor predominates when the pressure is low, and *vice versâ*. (*d*) The greater part of the carbonic anhydride in serum exists purely in a dissolved condition; the part associated with the blood-corpuscles is combined with them chemically, but so feebly as to be exactly similar to a state of solution of the gas, inasmuch as the carbonic anhydride content of hæmoglobin must greatly diminish with the pressure of carbonic anhydride. (*e*) The carbonic anhydride expired from the lung must therefore come from the serum as well as the blood-corpuscles. Its exit occurs by diffusion, and the entrance of oxygen into the blood-corpuscles is only to be regarded as a factor, inasmuch as it diminishes the pressure of carbonic anhydride in them.

The author's experiments also lead him to assume that (1) serum contains two kinds of chemically combining substances. One of these is not affected by treating the serum with carbonic anhydride, whereas the other splits up under its influence similarly to hæmoglobin, with liberation of new chemical affinities. (2) This latter body is precipitated in greater or lesser quantities under circumstances yet unknown. It may be paraglobulin.—*Journal of the Chemical Society*.

CARNIVOROUS PLANTS.

Dr. Hooker has offered some interesting observations at Belfast on this subject, which is one to which we have previously fully alluded. Various observers, he said, have described, with more or less accuracy, the habits of such vegetable sportsmen as the Sundew, the Venus's Flytrap, and the Pitcher plants, but few have inquired into their motives; and the views of those who have most accurately appreciated these have not met with that general acceptance which they deserved. Quite recently the subject has acquired a new interest, from the researches of Mr. Darwin into the phenomena which accompany the placing albuminous substances on the leaves of Drosera and Pinguicula, and which, in the opinion of very eminent physiologists, prove, in the case of Dionœa, this plant digests exactly the same substance, and in exactly the same way, that the human stomach does. With these researches Mr. Darwin is still actively engaged, and it has been with the view of rendering him such aid as my position and opportunities at Kew afforded me, that I have, under his instruction, examined some other carnivorous

plants. The early history of the subject was then explained up to the date of Mr. Darwin's investigation, the conclusions arrived at being that in the small family of the Droseraceæ we have plants which, in the first place, capture animals for purposes of food; and, in the second, digest and dissolve them by means of a fluid which is poured out for the purpose; and, thirdly, absorb the solution of animal matter which is so produced. The very curious group of Pitcher plants called Sarracenias next engaged attention. This genus consists of eight species, all similar in habit, and all natives of the Eastern States of North America, where they are found more especially in bogs, and even in places covered with shallow water. Their leaves, which give them a character entirely their own, are pitcher-shaped and trumpet-like, and are collected in tufts springing immediately from the ground; and they send up, at the flowering season, one or more slender stems bearing each a solitary flower. This has a singular aspect, due to a great extent to the umbrella-like expansion in which the style terminates; the shape of this, or perhaps of the whole flowers, caused the first English settlers to give to the plant the name of "Side-saddle Flower." The first fact that was observed about the Pitchers was, that when they grew they contained water; the second, that they have a digestive process analogous to that which takes place in the stomach of an animal. It is evident that there are two very different types of Pitcher in Sarracenia, and an examination of the species shows that there must probably be three. These may be primarily classified into those with the mouth open and lid erect, and which, consequently, receive the rain water in more or less abundance; and those with the mouth closed by the lid, into which rain can hardly, if at all, find ingress. I cannot take leave of Sarracenia without a short notice of its near ally, Darlingtonia, a still more wonderful plant, an outlier of Sarracenia in geographical distribution, being found at an elevation of 5000 feet on the Sierra Nevada of California, far west of any locality inhabited by Sarracenia. It has pitchers of two forms: one, peculiar to the infant state of the plant, consists of narrow, somewhat twisted, trumpet-shaped tubes, with very oblique open mouths, the dorsal lip of which is drawn out into a long, slender, arching, scarlet hood, that hardly closes the mouth. The slight twist in the tube causes these mouths to point in various directions, and they entrap very small insects only. Before arriving at a state of maturity the plant bears much larger, sub-erect pitchers, also twisted, with the tip produced into a large inflated hood, that completely arches over a very

small entrance to the cavity of the pitcher. A singular orange-red, flabby, two-lobed organ hangs from the end of the hood, right in front of the entrance, which, as I have been informed by Professor Asa Gray, is smeared with honey on its inner surface. These pitchers are crammed with large insects, especially moths, which decompose in them, and result in a putrid mass. I have no information of water being found in its pitchers in its native country, but I have myself found a slight acid secretion in the young states of both forms of pitcher. I might have added some additional cases to those I have dwelt upon. Probably, too, there are others still unknown to science, or whose habits have not yet been detected. But the problem that forces itself upon our attention is, how does it come to pass that these singular aberrations from the otherwise uniform order of vegetable nutrition make their appearance in remote parts of the vegetable kingdom—why are they more frequent, and how were such extraordinary habits brought about, or contracted? These remarks will, I hope, lead you to see that, though the processes of plant nutrition are, in general, extremely different from those of animals, and involve very simple compounds, yet that the protoplasm of plants is not absolutely prohibited from availing itself of food such as that by which the protoplasm of animals is nourished, under which point of view these phenomena of carnivorous plants will find their place as one more line in the continuity of nature.—*The Garden.*

EUCALYPTUS GLOBULUS.

The blue gum-tree of Tasmania has within the last few years received a great amount of attention in consequence of its alleged virtues as an antidote to the pestiferous miasmata of fever-stricken districts. It has been stated to possess the power of correcting or neutralising malaria, and by its influence to render habitable places previously so unhealthy as to be entirely deserted. No one can have failed to meet with paragraphs in the newspapers and periodicals referring to these properties, and from the somewhat sensational style of some of these an unusual interest has been excited, even among those who usually would take but little interest in such matters. It is, therefore, desirable to state what is really known about the tree.

It has long been recognised as one of the most valuable of timber trees, especially for ship-building, the wood being

very durable and of great hardness, whilst the immense size of the trees enables beams of vast span to be obtained. Trunks of 350 or even 400 feet high, and 100 feet in girth, are by no means unfrequent, and these dimensions are even exceeded by its close allies, *E. amygdalina* (the loftiest tree in the globe after the *Sequoria Wellingtonia*), the stringy-bark (*E. gigantea*), and the swamp gum; of the latter a plank was sent to the International Exhibition of 1862, 230 feet in length. *E. globulus* has been for many years cultivated in Australia, with others of its genus, of which between 100 and 150 are known. Its rapidity of growth is perfectly amazing, 160 to 200 feet being attained in Australia in about fifty years. Baron von Mueller, the energetic director of the Botanic Gardens, Melbourne, seems to have been one of the first to observe the influence of the tree on the climate of marshy districts, and in 1854 called the attention of M. Ramel, then in Australia, to it. In the years following, 1856—1860, seeds were plentifully supplied to him and others in France, and the tree extensively cultivated on the Mediterranean coast and in Algeria and Italy. Dr. Gimbert, of Cannes, has paid particular attention to the results of the Algerian plantations, and in publications dated 1870 and 1873 gives details which show that the tree undoubtedly possesses the property of rendering habitable marshy tracts with a miasmatic climate.

Though this influence appears to be real, we have no evidence which warrants us in speaking of the blue gum as a "fever-destroying tree." It is probable that the action is mainly, if not entirely, due to the large quantity of water absorbed by the roots of this rapidly growing organism. Those who know anything of plant-life are well aware of the great amount of fluid thus drawn from the earth, and it may well be imagined how great an influence a plantation of these large-leaved, quick-growing trees must possess in drying the soil. There are miasmatic regions which are not specially damp or marshy, though malarious emanations are, no doubt, usually accompanied by moisture. All that has been certainly shown in the case of the *Eucalyptus* trees is that they dry the soil, and so stop evaporation; and in cases where the previously marshy ground exhaled the mysterious malaria along with the evaporated moisture, when the latter is checked the former also ceases to be evolved. The action is, in fact, precisely analogous to that of artificial drainage. It is, however, believed by many that there is also an antiseptic influence in the agreeable aromatic emanations from the leaves. Such an action is probably imaginary; perhaps it would be

scarcely stating it too strongly to say that it is impossible. What is, however, certain is that the bark, taken internally, is a valuable febrifugal medicine, and it is perhaps from a comparison of the two distinct facts that the tree has acquired its reputation as "fever-destroying." The French physicians also recommend preparations of the leaves for chest affections and rheumatism.

Besides the south of Europe, the *Eucalyptus* has been largely planted, or sown, at the Cape, in Cuba, and other hot countries. It will grow in almost any soil, and young specimens may be seen at Kew, in the Botanic Gardens, Regent's Park, where the tallest is about 15 ft. high, and elsewhere. It is uncertain whether they would stand our winters, though it is stated that individual specimens have survived in the open air in Jersey and South Devon, and even in Sussex and Scotland. We may suspect some error in the latter locality, but in very sheltered spots in the south there seems a likelihood of the tree living for many years, till an exceptionally hard winter. So intolerant is it of frost, that even the trees planted by the railway in the Roman Campagna did not survive the winter. In the more protected Riviera the trees do very well, and the rate of growth near Nice is at least ten feet a year. Our readers will find further particulars about the *Eucalyptus* in a lecture by Professor Bentley, delivered at the Regent's Park Botanic Gardens, and recently printed.—*Land and Water.*

McDONNELL ON THE TORSION OF BLOOD-VESSELS.

Dr. Robert McDonnell, surgeon to Dr. Steeven's Hospital, Dublin, has reprinted an article on this subject from Dr. Brown-Séquard's *Archives*. After a few preliminary remarks, and a brief reference to the history of torsion, the author states, "Since the appearance of Mr. Bryant's memoir on the subject, in the *Medico-Chirurgical Transactions*, 1868, it has been practised by my colleagues and myself in Dr. Steeven's Hospital, Dublin." He quotes "with great satisfaction the words of Mr. Colles, as expressing our joint experience. For the last six or seven years, in Steeven's Hospital, my colleagues and I have seldom resorted to any other means of arresting hæmorrhage, even from the largest vessels, and we have never had reason to regret the adoption of the practice."

After advising any one desirous of making himself expert

in the art of torsion to begin by experimenting on the dead subject, he adds, "It is obvious that torsion is not to be applied to all kinds of vessels in exactly the same manner. Experience teaches us that we must adopt somewhat different expedients in securing by torsion vessels differing in size and position; the greater or less laxity of the tissue which surrounds the vessel, the character of its sheath, &c., all make it necessary to modify somewhat the mode of procedure. The surgeon should have at hand, therefore, several varieties of torsion-forceps, since a pair well suited to twist one vessel may not answer so well for another."

For vessels about the size of the radial or ulnar, he advocates toothed forceps, such as those generally known as "Syme's torsion-forceps." "The vessel is to be seized right across its open mouth, and drawn out a little; it is then caught just beyond the forceps, between the thumb and forefinger of the left hand, so that the nail of the thumb may give it a good pinch, and nip through the internal tunics; then twist, and all is secure." [In the reporter's experience, this part of the operation is unnecessary. Some surgeons' nails are anything but clean, and are therefore ill adapted for such close contact with part of a wound; and again, some nails are too stumpy to be available for such a proceeding, even if it were a necessary one.—*Rep.*] "The end may in the case of such vessels be twisted off or not, as the operator pleases." If the vessels be surrounded with a large quantity of lax areolar tissue, Dr. McDonnell recommends a pair of forceps, one end of which carries three small teeth, to fit between four teeth of the same size on the other end. The procedure consists here, again, of three steps, catching the vessel, nipping it, and torsion. "Such vessels as the brachial, femoral, or popliteal, are in general very readily secured by torsion;" but in amputations "in the neighbourhood of diseased structures, sinuses, &c.," where parts are "unyielding, it is by no means easy to get space enough beyond the ends of the first or grasping forceps to apply the second or nipping forceps. Under these circumstances, I adopt the following expedient. I place a silk ligature around the vessel immediately beyond the ends of the grasping forceps. This ligature I pull home until it snaps across. To make sure of accomplishing this with some facility, I have the silk fixed on little wooden cylinders, so that it can without hurting one's fingers be pulled home until it snaps across. It invariably snaps close to the knot (half), and is to be pulled off and cast aside. We thus accomplish by a snapped ligature what is done in other cases by the nipping forceps, and then proceed

to twist; three or four half turns are sufficient for the femoral, and I always, in this case, leave the end still standing." This mode, the author states, is very effectual, "and is applicable to vessels of all sizes which are unmanageable in other ways." "In fact, no readier way of securing ordinary sized arteries can be suggested than to put on, first, a silk ligature, and then to seize the knot in a pair of torsion-forceps, and twist it off. The vessel is perfectly secured, and there is no foreign body left in the wound. Large wounds are often then found healed on the twelfth to the fourteenth day; that is, about the time that, in cases where a bundle of ligatures have been left in a wound, these are beginning to separate." With respect to Dr. Addinell Hewson's forceps, designed to execute the double manœuvre of nipping the coats and grasping the vessel to twist it, Dr. McDonnell states that he has used a pair presented to him by their inventor. He has "had several opportunities of using them, and found them to do their work satisfactorily on vessels not surrounded with brawny, tough, infiltrated structure. Where, however, this condition exists, or, in fact, wherever there is any difficulty in drawing the vessel out a little from the surrounding structures, Dr. Hewson's forceps are open to the same objection as arises in attempting to use the cross-nipping forceps." There is not space enough to apply them and to nip properly beyond the ends of the grasping forceps. [Mr. Bryant, in *The Practice of Surgery*, describes only one pair of forceps as necessary for the operation of torsion even on large vessels. The reporter has not been in the habit of employing more than one pair of forceps for the process, which has consisted of seizing, grasping (without nipping), and torsion.—*Rep.*].—*London Medical Record.*

GREVE ON THE ACT OF VOMITING.

Carl Greve (*Berliner Klinishe Wochenschrift*, July, 1874) says that, although the experiments of several physiologists, and especially those of Magendie, seem to prove that the stomach is entirely passive during vomiting, and that the expulsion of its contents does not depend in the least on the contraction of its walls, yet numerous others still assign to it a more or less active *rôle*. The existence of a nervous centre for the act of vomiting, its situation and the nervous communications connected with it, being all more or less uncertain, Greve undertook some experiments to settle the disputed

question. He made use of apomorphia, which he finds to be the most certain and speedy of emetics, and accompanied by far fewer concomitant and subsequent effects than any other. Vomiting occurs after division of the vagi. The negative results obtained by Quehl in this respect were due to his having tied the dogs experimented on upon their backs, in which position they hardly ever vomit except when their stomachs are full. When dogs have emptied their stomachs in the morning by violent vomiting, they will not vomit in the afternoon when tied either upon their backs or bellies, but will do so at once if set free and an emetic administered. They vomit more easily when placed on their bellies than on their backs. After the injection of apomorphia apnœa cannot be produced; and, *vice versâ*, when vigorous artificial respiration is kept up, it counteracts the emetic power of apomorphia. The centre for vomiting is identical with or close to the respiratory centre. The nervous path along which the irritation is propagated from the vomiting centre to the organs concerned in the act lies in the spinal cord as far as the sixth dorsal vertebra. When the cord is divided below this point vomiting still occurs, but not when the point of section is above this vertebra. The stomach takes no part whatever in the act of vomiting.—*London Medical Record.*

IMPROVEMENTS IN TOXICOLOGICAL INVESTIGATIONS.

By F. Selmi.

'Gaz. Chim. Italiana,' ii, 544—551, 583—588. Abstracted from the 'Memoirs of the Bologna Academy of Sciences' [3], vol. i.

I. *Detection of Arsenic.*—The author asserts that the ordinary methods for the detection of arsenic in cases of poisoning do not yield the whole of the arsenic present, and that sometimes they fail to give any indication of arsenic whatever, though it be present, *e.g.* when Reinsch's test is applied to a mixture containing the sulphide. He proceeds as follows:—The organic substance suspected to contain arsenic is introduced into a retort with a little water, and monohydrated sulphuric acid is then added, elevation of temperature being avoided. To the retort is fitted a tubulated receiver, and to this two Woulfe's bottles containing water. A current of hydrochloric acid gas is passed through

the organic mixture, the retort and receiver being placed in an oil bath, as soon as the reaction becomes quiet, and kept at 105°—110°. If the temperature rises above this point, sulphurous acid is formed. The arsenious chloride in the bottles is precipitated by sulphuretted hydrogen. By this method the author detected arsenic in mud containing $\frac{1}{500000}$ of its weight of that metal, whether it was in the state of arsenious or arsenic acid, or of the sulphide. Antimony compounds do not interfere with the reaction. (There is nothing new in the principle of this process, nor does it appear how this particular application of it overcomes the difficulty, *e.g.*, of decomposing the sulphide.) Instead of causing the suspended sulphide to agglutinate, after precipitation, by heating, the author adds some carbon sulphide, and agitates the liquid. After standing at rest, the globules of carbon sulphide at the bottom are found enveloped by a pellicle of arsenious sulphide. On pouring off the liquor and leaving the residue exposed to the air, the carbon sulphide evaporates, and leaves the arsenious sulphide, which is then treated by the usual methods. Its conversion into arsenic acid is very easily effected by boiling it in sulphuric acid, mixed with a little water and nitric acid. In oxidizing the arsenic mirror the author adapts a bulb-tube containing alkali to the oxidizing tube, and draws air through the apparatus. In burning the arsenetted hydrogen he uses the following modification of Flaudin and Danger's apparatus. The flame is introduced as usual into the small chimney, to which is fitted a tubulated flask, carrying in the tubulure a long glass tube. A stream of cold water flows over the tube and flask, which then condenses the arsenious acid.

REACTION OF MILK WITH LITMUS.

By A. Vogel.

'J. pr. Chem.' [2], viii, 137—144.

The most contradictory statements have been made as to the reaction of normal fresh cows' milk with litmus, numerous observers having found the reaction of milk to be acid, while an equal number describe it as alkaline.

Soxhlet's view is that milk possesses what he calls an *amphoteric* or *amphigenic* reaction, *i. e.* that it has the remark-

able property of turning simultaneously red litmus blue and blue litmus red, and this arises from the fact that milk contains both acid and neutral phosphates of the alkali-metals. Heintz maintains that a fluid containing both acid and ordinary alkaline phosphates simply imparts a violet colour to red and blue litmus-paper.

Instead of litmus-paper the author uses a carefully prepared neutral tincture of litmus, and, as the result of his experiments, states that he has never yet found freshly drawn cows' milk with a decided alkaline reaction.

If litmus-tincture which has been reddened by milk is left exposed to the air in a watch-glass, it gradually loses the red colour and passes into blue, while if it be closely corked up it retains the red colour, though in some cases it seemed to become slightly blue in the course of an hour or two.

In either case it acquires after three or four days a deep red, owing to formation of lactic acid. Hence it follows that in normal fresh cows' milk there is no free lactic acid. Litmus-tincture reddened by milk also becomes blue if shaken up and poured backwards and forwards from one vessel to another, and more especially on heating.

The author thinks that the restoration of the blue colour in these cases is due to the escape of carbonic acid which fresh milk contains. Soxhlet also found that milk, when subjected to the action of the air-pump, gave up carbonic acid, and became decidedly alkaline.

Other tests for alkalinity in liquids were also applied by the author to milk, with negative results.

Out of the milk of thirty cows which was examined by Professor Bischoff at Schleisheim, only two specimens showed the double reaction with certainty. In the greater number of cases the reaction was either neutral or transiently acid. Some specimens, however, gave at first a weak alkaline reaction quickly passing into, an acid reaction. This might have been due to ammonia absorbed by the milk, since the experiments were made in the stalls.

The matter requires further investigation.—*Journal of the Chemical Society*.

VULPIAN ON THE JUNCTION OF SENSORY AND MOTOR NERVES.

Physiologists are acquainted with the experiments made by M. Vulpian, along with M. Philipeaux, several years ago, with reference to the point whether nerve-fibres anatomically alike were similar also in their physiological qualities. They joined the peripheric end of a motor nerve, the hypoglossal, with the central end of a sensory nerve, the lingual. In three or four months the union was complete, and the peripheric end of the hypoglossal nerve, which had been altered through the operation, had recovered its normal structure. On then stimulating the lingual nerve, considerable movements were produced in the corresponding part of the tongue.

M. Vulpian has, more recently, found reason to question the truth of his inference from these experiments, for he observed that one of the branches of the chorda tympani accompanies the lingual nerve in its distribution to the tongue. Thus, the lingual nerve contains, throughout its course, anastomotic fibres proceeding, by the chorda tympani, from a motor nerve, the facial. He inquired what *rôle* was to be attributed to this anastomosis, in the physiological change undergone by the lingual nerve when the hypoglossal of the same side has been cut; and he found that the lingual nerve then acquires, in a few days, a motor action on the tongue, which it has not in the normal state.

The fact once ascertained, it became necessary to further inquire if the excitations produced in the central end of the lingual (in the experiment of uniting the lingual and hypoglossal), after the peripheric segment of the hypoglossal is regenerated, are transmitted to this segment by sensory fibres of the lingual nerve, or by anostomotic fibres of the chorda tympani. M. Vulpian has made a number of experiments on dogs with this object (*Comptes Rendus*, June 26). Six of the animals survived long enough to give satisfactory results. The procedure was as follows. The central end of the lingual nerve was joined with the peripheric end of the hypoglossal nerve, by a suture-point; the central segment of the latter nerve having been extracted, and also a long piece of the peripheric segment of the lingual. Three or four months after this, the author cut the chorda tympani on the same side, in the tympanic cavity; and ten or twelve days after the section, the central end of the lingual nerve was laid

bare. It was cut across as high up as possible, and the part in connection with the hypoglossal nerve was irritated with electrical or mechanical stimuli. Not the least contraction was observed in the corresponding part of the tongue. (The union was ascertained to have been complete, and the peripheric end of the hypoglossal was regenerated.) In the case of one dog the junction was made on both sides, but the chorda tympani was only cut on the left side. On irritating the left lingual with interrupted currents, no movement took place in the left half of the tongue; whereas electrification, or pressure with forceps, of the right lingual gave rise to very distinct contraction in the right half of the tongue. (Here, too, it was made sure that the junction had been complete on both sides.)

It would appear (from some further observations) that most of the fibres that are regenerated in the peripheric segment of the hypoglossal, when this nerve has been united with the lingual, have not, at least for some time, any action on the muscles of the tongue; and that if movements of the tongue be produced by electrifying this nerve-segment, the excitation is conducted to the muscles only by a small number of fibres, viz. by those which are in relation with the fibres of the anastomotic branches given to the lingual by the chorda tympani. Thus, either the greater number of regenerated fibres in the hypoglossal segment do not at once take their normal relations with the muscular bundles of the tongue, or these regenerated fibres are essentially merely prolongations of fibres of the central end of the lingual nerve, and, like them, are incapable of inducing contraction. In any case (M. Vulpian concludes) the experimental facts described show clearly that the experiments of uniting, end to end, the lingual and hypoglossal nerves cannot any more be cited as proving that electrical or mechanical excitations of the sensory nerves can be freely transmitted to motor fibres. "Our former experiments were exact, but the interpretation we gave them, and which has been adopted by the majority of physiologists, was erroneous. The new ideas we have acquired as to the physiology of the chorda tympani could alone indicate the error. The results of our present experiments, however, cannot be considered as a peremptory refutation of the opinion of physiologists, which represents that sensory, motor, and sympathetic fibres have the same intrinsic physiological property, neurility, a property which in action gives rise to different functional effects according to the central and peripheric connections of the nerve-fibres in which it appears. The question of identity of physiological

property in all nerve-fibres remains a disputed one, and it is difficult to foresee in which way it will be decided."—ALEX. B. MACDOWALL, *London Medical Record.*

MARCET ON THE NUTRITION OF ANIMAL TISSUES.

IN a pamphlet (pp. 52) giving an account of an experimental inquiry into the nutrition of animal tissues, Dr. Marcet arrives at the following conclusions:—1. The physical constitution of a muscle resembles that of a jelly. 2. In all tissues there are three classes of substances—(*a*) those forming the ripe tissue, which are insoluble in water; (*b*) those constituting the nutritive material, soluble in water, and colloid; (*c*) the effete products, soluble in water, crystalloid, and diffusible. 3. The nutritive material and ripe tissue have the same chemical composition. The mature tissue is merely the nutritive material in an organized form, the change from one to the other being purely morphological. 4. In muscle, the whole of the phosphoric acid is eliminated in the form either of a neutral tribasic phosphate or a pyrophosphate of potash. At the same time, some phosphoric acid and potash are present in the flesh which are not in the proportion of a phosphate, and take part exclusively in the formation of ripe tissue. 5. The albuminous constituents of muscle appear to be eliminated as kreatine, kreatinine, and other crystalloid substances. 6. Muscular tissue takes from the blood more potash than it requires for its formation, the excess being necessary to the elimination of phosphoric acid by converting it into a crystalloid phosphate. 7. The nutrition of lung-tissue appears to differ from that of muscles by being much more rapid, for it contains a much larger proportion of nutritive substance, and much less waste than muscular tissue. 8. Potash is eliminated from the lungs in great measure as crystalloid carbonate, instead of in the form of phosphate, as it is in muscles. This is due to the carbonic acid in the lungs. 9. The proportion of phosphoric acid and potash is different in wheaten flour, potato, and rice, but the proportion of total to colloid phosphoric acid and potash is very nearly the same in each. 10. Muscles in phthisis differ from the normal in containing less nutritive material and mature tissue, rather more water, and a much higher proportion of chlorine and soda. 11. In phthisis the waste of muscles occurs in the normal way, and the potash and phos-

phoric acid present in the effete products are in exactly the right proportion to form a pyrophosphate. 12. The emaciation in phthisis appears due mainly to the blood not being in the proper condition to supply nutritive material to muscular tissue. The damp or wet state peculiar to muscles after death from phthisis appears to show that their colloid state is somewhat deficient in that disease. 13. The tubercular or adenoid formation in pulmonary tissue actually undergoes nutrition, and is consequently a growth, the phosphoric acid of potash being apparently eliminated, as in the case of muscle, under the form of a cystalloid phosphate. The nutrition of the abnormal growth accounts for the almost invariable absence of any smell of decomposition when a *post-mortem* examination is made shortly after death from phthisis. 14. The softening of tubercular substance appears due to a loss of colloid power. It can hardly be due to an increase in the proportion of water, as softening tubercle contains very little more water than healthy lung. 15. There appears to be no increase of fat in tubercle, the mean being 2·14 per cent. in healthy, and 1·95 in diseased lung-tissue. The diseased lungs, however, contain more water, and the proportion of fat in their dried residue is slightly greater than in the dried residue of healthy lungs. 16. In nature soluble matter is undergoing perpetual transformation, passing in rotation from the crystalloid to the colloid, and again from the colloid to the crystalloid condition. Chloride of sodium alone appears to be an exception to this rule.—*London Medical Record.*

CONTAGIOUS DISEASES (ANIMALS) ACT.

A MEETING of the committees appointed by the local authorities of the counties of Aberdeen, Banff, and Moray, to bring the state of the existing law as to contagious diseases among animals under the notice of the Duke of Richmond, President of the Privy Council, who controls the veterinary department, was held at Keith. There were present—on behalf of Aberdeenshire—Sheriff Comrie Thomson, Colonel Innes of Learney, Mr. Barclay, M.P., and Mr. Scott, Glendronach; on behalf of Banffshire—Sir George Macpherson Grant, Bart., and Mr. Garland, Cowhythe; on behalf of Moray—Dr. Maclean, Elgin; Provost Cameron, Elgin; Mr. Geddes, Orbliston; Mr. Williamson, Shempston; and Mr. Yule, Coulard Bank; Sir George Macpherson Grant in the chair.

Sheriff Thomson having explained the circumstances under which the committees had been appointed by the three counties, stated that the Aberdeen Committee held a meeting on Friday for the purpose of coming to an understanding as to the matters to be laid before the Duke of Richmond. The first defect in the existing law related to the period during which a place infected with pleuro-pneumonia was subject to the restrictions of the Act after the last fresh case. The Aberdeenshire Committee were unanimous in thinking the period of thirty days too short. The second was that the provisions of the Act for enforcing the slaughter of cattle affected with pleuro-pneumonia should be put in operation in Ireland as well as in England and Scotland, as the experience of this district showed that the importation of Irish cattle was a fruitful source of the disease. On this matter, too, the Aberdeen Committee was unanimous. And the third point related to the remissness of certain local authorities, and the want of uniformity in enforcing the law throughout the kingdom. In the counties here represented the provisions of the Act were, he believed, properly enforced; but there was too much reason to believe that in certain counties comparatively slight efforts were made to exterminate disease.

The Chairman suggested that these points might be discussed one by one.

Mr. Barclay, M.P., said there was a general concurrence of opinion that the period of thirty days provided by the Act was too short, but differences existed as to how far it should be extended. Some thought sixty days sufficient, others thought it should be three months, and others even four months. The Select Committee in the House of Commons in their report had recommended sixty days. He had suggested three months, but on further consideration he thought sixty days as long as could be effectively enforced. If the period were made three or four months, licences for removals would be extensively required, and in granting licences he feared laxity would prevail. Sixty days would be a great improvement, and as long a period as could be enforced with efficiency.

After fully discussing the question in its different bearings, the meeting were unanimously of opinion that, although the disease might reappear after a longer interval than two months, that period was as long as could be effectively enforced.

The second point, namely, that the provisions as to slaughtering animals affected with pleuro-pneumonia should be extended to Ireland, was then taken up.

Mr. Barclay stated that he was of opinion (and he knew that his opinion was generally shared by those taking a leading interest in the subject in England and some counties in Scotland), that they could not hope to be successful in exterminating this disease unless the same policy of slaughtering out was pursued in Ireland as on this side of the Channel. The efforts to eradicate the disease had been so far successful, but it was from time to time again imported into the country, and in the case of the north-eastern counties investigation showed that a large proportion of the new outbreaks were due, directly or indirectly, to Irish cattle. He believed the slaughtering of diseased cattle would be more beneficial to Ireland than to England and Scotland, for he was sure he would be borne out in stating that the doubtful character of Irish store cattle as regards disease depreciated their price in this country 10 to 15 per cent. It was clearly unjust that this country should be put to the heavy expense of attempting to slaughter out the disease, so long as it was renewed by the import of Irish cattle. He believed these views were so strongly held in England that if the compulsory slaughtering was not extended to Ireland, strong representations would be made to the Privy Council by English local authorities to have the Order in Council for compulsory slaughter in England and Scotland rescinded.

Sheriff Thomson suggested that the Duke of Richmond should be informed that the three counties were clearly of opinion that these provisions should be continued, and extended to Ireland.

The Chairman said that so long as they were bound to slaughter affected animals in Scotland and England, he saw no reason why Ireland should be exempt. The local authority of this country certainly approved of that provision.

Provost Cameron said that they were also approved of in Morayshire. It was then unanimously agreed to urge on his grace the necesslty of rendering the slaughter of affected animals compulsory in Ireland.

Necessity for Uniformity in Enforcing the Law.—The third point was then discussed, and the meeting was unanimous in thinking that there was great laxity in carrying out the provisions of the Act in certain parts of the kingdom, and that the duke should be requested to give the matter his serious consideration, with the view of having the law more stringently and uniformly enforced.

Colonel Innes thought it might be well to suggest to his grace some way by which it could be enforced more strictly

and uniformly, whether by the appointment of Government inspectors or otherwise.

Sheriff Thomson concurred in thinking it might be desirable that Government inspectors should be appointed, but thought the details of the matter might be left to the duke.

Mr. Garland complained of the number of Orders in Council in force, and of the difficulty experienced by local authorities in understanding the law they had to carry into effect.

The meeting concurred in the view that a simplification and consolidation of the various Orders in Council were extremely desirable; and if a settled policy in dealing with disease was adopted and adhered to by the Government, local authorities and the public generally would become familiar with the law, and have much less difficulty in carrying out the various regulations.

Mr. Barclay then called attention to the fact that in most counties there were several local authorities, and in consequence a want of uniformity of action. He thought it very desirable that the burghs should be amalgamated with the counties in which they are situated, with proper representation of the burghs at the county board. He had brought this under the notice of the Select Committee of the House of Commons, and they had reported that amalgamation was desirable in Scotland, that the general expenses should be levied over the whole district, and the cost attending the slaughter of cattle only over the burgh or landward part of the county wherein the slaughter takes place.

The meeting unanimously agreed that this alteration of the Act should also be recommended to the Duke of Richmond.

Sheriff Thomson then moved that a deputation should be appointed to wait on the Duke of Richmond, and bring these matters under his consideration. This was agreed to, and three gentlemen were chosen from each of the three counties. For Aberdeenshire, Sheriff Thomson, Colonel Innes of Learney, and Mr. Barclay, M.P.; for Banffshire, Sir George Macpherson Grant, Mr. Taylor of Glenbarry, and Sheriff Gordon; and for Morayshire, Provost Cameron, Dr. Maclean, and Mr. Geddes, Orbliston.—*Mark Lane Express.*

THE PLEURO-PNEUMONIA ORDERS.

On Saturday, Oct. 17th, at the meeting of the committee in Norwich, a discussion took place on a motion, of which notice

had been given by Mr. Jex Blake, as follows, namely, "That the Court of Quarter Sessions be requested to present a memorial to the Privy Council, praying that the Order of the 2nd August, 1873, as to the slaughter of cattle affected with pleuro-pneumonia, be extended to the whole of the United Kingdom, or that such Order be rescinded."

Mr. Jex Blake duly moved his resolution, which was seconded by Mr. R. Gillett.

The Earl of Kimberley said the line he took on the subject in the few remarks he had made this year in Parliament was very much the same as that indicated in the resolution. It was clear that if the experiment of slaughtering cattle affected with pleuro-pneumonia were tried it must be tried fairly. It was ridiculous to pretend we were trying the experiment when we were slaughtering only in one part of the kingdom and not in another. The thing was so absurd, as he said in Parliament, and no one could venture to say a word in reply. He consulted the late Lord-Lieutenant of Ireland, Earl Spencer, who had much experience in Irish affairs, on the subject, and he said that he thought the Order ought to be extended to Ireland. Although pleuro-pneumonia might not be bad now in Ireland, yet it had been bad there. When he lived at Phœnix Park it was impossible for him to keep a cow alive, so bad was pleuro-pneumonia. Having Government money to spend he took the greatest possible pains, but as fast as he got them in they died. Phœnix Park was a hotbed of disease. It was a place where agist stock were taken in, and as it was not far from the markets, it might be imagined how the disease spread all over the country.

Mr. C. S. Read, M.P., said there was now a very rigid examination at the ports of embarkation in Ireland, and that the Privy Council were doing all they could by inspection to prevent the spread of the disease. That was what Privy Councils in England and Ireland had relied upon. But it was utterly impossible to detect a disease which was for so long a period incubating.

The Earl of Kimberley.—Absolutely impossible.

Mr. Read said that there was said to be very little pleuro-pneumonia now in Ireland, but that did not prove to his mind it did not exist. The Government would find that the moment they gave compensation to owners of stock in Ireland affected with pleuro-pneumonia it would be found there would be many cases where there now was one. Speaking of the extent of the disease in Norfolk they were constantly being laughed at in the Privy Council because it was considered to be the most diseased county in England. Of course it was, because

it was where there was sent the residuum of everybody's stock. If an ordinary bullock could not be sold in Ireland, Scotland, or Wales, as a matter of course it came to Norfolk, where it found a market. And then they were told, after they killed an extraordinary quantity of stock—no less than a thousand a year—and paid upwards of £5,000 out of the county rate as compensation and inspectors' salaries, that they were not doing their duty. But he contended that Norfolk was doing its duty to the best of its power, regardless of the cost and trouble inflicted upon the owners of stock. When they applied to the official of the Privy Council for advice they were recommended to separate the healthy from the diseased cattle, and were told to take the temperature of the animals every morning to ascertain whether they were likely to become subject to the disease. He should like an inspector from the Privy Council office to be stationed on the Yarmouth marshes to have the fun of introducing a thermometer into the rectum of a bullock on those marshes, and he feared he would be sick of the performance at the end of the week (laughter), and when he returned to London he certainly would not recommend any such tomfoolery to them in Norfolk in future. The theory propounded by the veterinary surgeons of the day was that pleuro-pneumonia could only be communicated by the breath of a diseased animal. Therefore a lot of cattle might be huddled together, and if there was not a diseased or partially diseased bullock amongst them they would not have pleuro-pneumonia.

The Earl of Kimberley supposed the breath of diseased animals was blown a long distance, for an animal belonging to him that was never in communication with any diseased animal had pleuro-pneumonia; and what was more remarkable, none of the other animals took the disease. No doubt there were some indigenous cases of disease. The sudden change of climate had, perhaps, something to do with the disease of Irish cattle. There was a vast difference between the climate of Ireland and that of Norfolk, especially at the time of year when cattle were brought over. Many animals predisposed to disease then ran considerable risk. This was a strong argument for bringing over only thoroughly sound cattle. Cattle coming from Galway and Balinasloe markets experienced a great change of climate, which had, no doubt, much to do with the disease.

The resolution was unanimously agreed to.—*Norwich Mercury*.

THE BEARING-REIN.

Letter from Mr. B. Cartledge, M.R.C.V.S., Sheffield.

We have been requested to give insertion to the following letter relative to the discussion which is taking place on the use and abuse of the bearing-rein. The letter has already appeared in the *Sheffield Independent:*

"*Society for the Prevention of Cruelty to Animals.*

"*The Bearing-rein.*

"To the Editor,—At a recent meeting of the committee of the above society it was resolved that public attention should be called to the cruelty practised by the use of the bearing-rein. It is almost needless to say that a horse when under any unnecessary restraint cannot perform his work with comfort; and the society here for the Prevention of Cruelty to Animals have observed, what must be patent to all who take any interest in animals working in our midst, that the bearing-rein is as unnecessary as it is cruel. Witness horses struggling with heavy loads up the hills of our town with their heads fixed by this barbarous method, and then ask if any possible good can be derived from its use.

"I know that many carters, or those in charge of horses, say that the bearing-rein keeps horses from falling. This is an utter fallacy. A horse unfettered by the bearing-rein can the better see his way, will avoid bad parts of the road, and, like the sensible animal he is, will take care of himself if allowed to do so. The bearing-rein is a needless and cruel tax on muscle and sinew, and prevents an animal throwing the weight of his body into the collar, which is alone sufficient to move an ordinary load. The use of the bearing-rein is one of the most common causes of the disease called "roaring," owing to the unnatural position into which the head is dragged; and besides this, the angle of the mouth is frequently deformed by it.

"Would a carter carry a sack of corn up High Street with any more comfort or safety to himself if he had an iron bar in *his* mouth with a cord attached to it, and his head made a fixture?

"It is, however, to the intelligent owners of horses that the society desire to call special attention to the evils of the bearing-rein. They can insist that no such piece of torture shall be used amongst their own horses. Were this generally done much suffering would be prevented, and the

society at whose request this letter is written would, I am sure, receive the thanks of every horse previously tortured by the bearing-rein, had he the power to express them.

"It may be observed that the horses of the Midland Railway Company here and elsewhere have neither bearing-rein to fetter them in their work, nor blinkers to place them in darkness. Their system is the correct one, and few horses convey heavier loads, and no similar large establishment hereabouts is so free from 'roarers.'

"Overloading, habitual and unnecessary flogging, and many other forms of cruelty are hourly practised in our town.

"Overloading is resorted to for gain; flogging is often the result of ignorance, and a total disregard for pain inflicted. A driver either does not know when an animal is doing his best and has no further effort in him, or having a whip in his hand he plies it without reason and without mercy.

"These acts of cruelty, it must be remembered, are more commonly inflicted on the old and infirm. The hardship seems the greater when the history of many such horses is thus briefly told:—A horse during the time of his being well fitted for work is in good hands—that is, he is well fed, well housed, and moderately worked. He becomes old, ill-looking, or permanently lame, and in consequence is sold. He passes into worse hands; is worse fed, worse housed, harder worked, and in all other respects worse treated, if not cruelly abused. This is too often the end of many a good, willing animal, and faithful servant. He has more work to do when he is least able to do it, and less comforts when he most needs them!

"There will always be poor dilapidated horses, and I fear there will always be wretches who treat them ill. But relief will be given to many by the discontinuance of the bearing-rein, and by a general desire to check cruelty in supporting the efforts of the Society for the Prevention of Cruelty to Animals.

"I am, yours faithfully,

"B. Cartledge.

"Norfolk Street, *Oct. 2nd*, 1874."

REGULATIONS RELATING TO A GIFT OF FIVE HUNDRED GUINEAS OFFERED BY J. REILLY, ESQ., OF MANCHESTER, FOR THE ENCOURAGEMENT OF RESEARCH INTO THE NATURE AND TREATMENT OF HYDROPHOBIA.

A PRIZE of 500 guineas having been offered by J. REILLY, Esq., to the discoverer of a cure for hydrophobia, a committee composed of the following gentlemen consented to draw up the conditions of the competition:—

J. BURDON SANDERSON, M.D., F.R.S., Professor of Physiology in University College, London.

GEORGE SOUTHAM, Esq., F.R.C.S., Professor of Surgery in Owens College, Manchester.

ARTHUR GAMGEE, M.D., F.R.S., Brackenbury Professor of Practical Physiology in Owens College.

GEORGE REED, Esq., M.D., Superintendent of the Manchester Royal Infirmary.

JOHN LAWSON, Esq., M.R.C.V.S.

M. H. CHADWICK, Esq.

As it appeared to the Committee that the probabilities of any specific cure for the disease being discovered were very remote, they suggested to Mr. Reilly the advisability of offering, periodically, smaller Prizes, to be awarded to the author of the best essays on hydrophobia, providing they contained some results of original research tending to throw light on the origin, nature, or treatment of the disease. Mr. Reilly has generously acquiesced in the views of the Committee, and has agreed to supplement his original offer of a prize of 500 guineas in the following manner:—In case, as may probably occur, no remedy should be discovered of such unquestionable merit as to deserve the reward of 500 guineas, the donor proposes to place at the disposal of the Committee in August, 1875, a sum of 50 guineas, to be awarded to any person who shall make any original investigation throwing light on the origin, nature, and treatment of hydrophobia, and further, a similar sum at the end of every two years until the desired discovery be made.

The *Great Prize* of 500 guineas will only be awarded in the event of its being proved to the satisfaction of the Committee that a successful mode of treating hydrophobia in man or the lower animals has been discovered. The evidence that such discovery has been made must be submitted to the Committee in writing, in the English language.

With relation to the Essay Prizes the Committee have drawn up the following Rules:—

1. All competing essays shall be written in English, or if in a foreign tongue, shall be accompanied by an English translation, for the accuracy of which the competitor shall be responsible.

2. The essays or dissertations must be signed by their authors, and are to be forwarded, duly secured and sealed, to Mr. CHADWICK, St. Mary's Street, Manchester.

3. The competition shall be open to persons of all professions and callings, and of any nationality.

4. Essays intended to compete for the prize must be sent in on or before June 1st, 1875.

5. Notice will be given in three medical and at least three general newspapers once annually of the terms of the competition. The award will be made known in the same manner within two months after the day named for the essays to be sent in.

As a guide to those who may be willing to compete for the above-named prizes, the Committee think it right to add that they will be inclined to consider favorably any essays which contain any positive contributions to our knowledge of hydrophobia, whether they appear to have an immediate bearing on its treatment or not. They would draw the attention of competitors to the want of all reliable description of the morbid anatomy of hydrophobia.

August, 1874.

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING OF COUNCIL, HELD OCTOBER 7TH, 1874.

Present.—The President, in the chair; Professor Pritchard, Assistant-Professor Axe; Messrs. J. C. Broad, Harpley, Field, Fleming, Balls, Cartwright, Moon, Gowing, Greaves, Naylor, Moore, Withers, Cheesman, Hunt, and the Secretary.

The Secretary read the notice convening the meeting.

The minutes of last meeting were read and approved.

Correspondence.

Letters were read from the following:

Mrs. Lepper, of Aylesbury, in which she conveyed to the President and Council of the Royal College of Veterinary Surgeons her sincere thanks for the expression of their condolence and sympathy in the sad bereavement she had sustained by the death of her husband.

Mr. M. E. Naylor, Wakefield, desiring to present to the College Museum specimen feet of two horses, aged three and five years old, which had not been subjected to the rasp or drawing knife; also specimens of calculi, the larger one taken from an miller's aged horse, which had never been ill until thrown down in the wagon shafts, and which, after six or seven days, gradually sank, and apparently without pain; also a series of photographs of the larger calculus.

On the motion of *Mr. Broad*, seconded by *Professor Pritchard*, a vote of thanks was unanimously awarded to Mr. Naylor for his presentations.

Letters from Messrs. Packman, Hurrell, and Osborn Hills, wishing to be informed whether the members of the Royal College of Veterinary Surgeons are exempt from serving upon juries. In reply, they were informed that they were not exempt, but that a Bill was before the House of Commons for the obtainment of the necessary exemption.

Mr. Hills, in his letter, expressed his intention to subscribe five guineas towards the College Fund.

Letter from Mr. J. D. O'Neil, Gainsford Street, Islington, stating that he had received, some years ago, a vote of thanks from the Council of the Royal College of Veterinary Surgeons for having advocated, in the *Standard* newspaper, that members of the Royal College of Veterinary Surgeons were the only Body to select sanitary inspectors from in the metropolis during the cattle plague, and that he had now in his possession an old work published in 1747 on the subject of the cattle plague in England, which he offers as a loan for inspection. In reply, he was thanked for the interest which he took in the profession, and was told that it was scarcely worth while to trouble him for the loan of the work, as the library of the College already contained several authorities on the same subject.

A letter from Messrs. Harper, Broad and Co., solicitors, Rood Lane, desiring to be informed whether John Knight, of Cheshunt, is a member of the College, because they had reason to suspect he had no right to the title. In reply, they were informed, that there was no such name on the register of members of the Royal College of Veterinary Surgeons.

Professor Pritchard asked why Messrs. Harper should not be informed that the party in question was not a veterinary surgeon.

Mr. Harpley explained that, some time ago, an inquiry of a similar description respecting another party was made, that the matter was then brought before the Council, and that an answer to the same effect as the one furnished in the present instance was then agreed to be given: *namely*, that the individual was not a member of the Royal College of Veterinary Surgeons. This course the Council had adopted, because, in giving a more explicit reply, some mistake might be made which would compromise them, and perhaps expose them to an action at law.

With this explanation the subject was allowed to drop.

Letter from Mr. W. Duncan, solicitor, 21, Duke Street, Edinburgh, stating that he had been instructed by Mr. Fearnley, late Principal of the Edinburgh Veterinary College, to apply to the Council to recognise certificates granted by him to students attending a course of lectures on veterinary surgery in the School of Arts in Edinburgh.

He was informed that the letter would be laid before the Council at their next meeting.

Mr. Gowing thought that the Council should consider well before recognising such a certificate.

Mr. Fleming could not see, under the circumstances, what object there would be in recognising the granting a certificate at all. The recognition was only asked for a course of lectures, and the certificate could not take the shape of a school certificate, and would not, therefore, be of use to anybody. The students who attended that course of lectures could not present themselves for examination before the examining body of the Royal College of Veterinary Surgeons.

Mr. Gowing said he understood it would be acknowledged as part of their education.

Mr. Harpley asked whether, on any previous occasion, authority had been obtained from the Home Office to grant a sign manual before the application was made to the College.

The Secretary said, in reply, that the establishment of a veterinary school rests with the Government, and the Council had no power to recognise it until the sign manual had been obtained.

Mr. Harpley thought that, under the circumstances, Mr. Fearnley should be informed that, until he obtained the sign manual from the Home Office, the Council was not in a position to deal with the matter.

It was then agreed that a reply to this effect should be sent to Mr. Fearnley by the Secretary.

Professor Pritchard expressed his concurrence in the views which had been advanced on the subject.

Another letter from Mr. Duncan, stating that Mr. Fearnley intends issuing a prospectus of his intended lectures, and therefore wishing to be informed when the next meeting of the Council would be held.

An answer was sent, giving the information.

Letter from Professor Walley, Veterinary College, Edinburgh, asking whether members of the Pharmaceutical Society who had passed the preliminary examination were required to undergo the matriculation examination, and whether he was correct in assuming that holders of certificates from recognised schools or universities are eligible for admission without an examination.

He was informed that the question of preliminary examinations rests with the schools, and not with the Council of the Royal College of Veterinary Surgeons.

Letter from Dr. J. D. Moffat, Union Street, Glasgow, stating that he was an M.D. of the Edinburgh College, a surgeon of the Glasgow faculty, and lecturer on materia medica in the Glasgow Veterinary College; and as he is desirous of becoming a member of the Royal College of Veterinary Surgeons, he wished to be informed whether his certificates in chemistry, materia medica, and physiology, would be recognised; and if so, he would forward them for inspection.

Professor Pritchard said that this was hardly a matter the Council could deal with. If the gentleman in question was desirous of becoming a member of the Royal College of Veterinary Surgeons, he must enter one of the recognised schools, and allow the authorities of those schools to deal with whatever qualifications he may possess.

The President concurred in this view, and directed that a reply should be sent in accordance therewith.

A letter from Mr. William Beckett, of Tadcaster, late a student of the Edinburgh Veterinary College—who withdrew himself from the examination in April, 1872, enclosing a letter from Dr. Dunsmure, and the receipt for his examination fee then paid—requesting that the fee may be now refunded to him, as he did not wish to present himself for examination.

The Secretary was instructed to reply that he was at liberty to present himself on a future occasion for examination, but that the fee could not be returned.

Letter from Dr. Dunsmure, Queen Street, Edinburgh, acknowledging the receipt of a copy of the *Register*, and requesting that the examination papers be sent on July 16th. The names of students would be sent soon after the examinations. He did not think that the London plan for the obtaining of signatures to the diploma would answer in Scotland.

Another letter from the same gentleman, stating that he had forwarded, per rail, all the examination papers for Scotland, with the exception of two record papers sent to Glasgow for Professor Dickson's signature, to be forwarded from thence. The accounts of examinations, with the receipts and expenditure, would be sent as soon as the accounts were paid.

Another letter, enclosing a report of the

Scotch Examinations,

held in Edinburgh and Glasgow on the 20th July, and following days. It stated, that in Edinburgh the Board met three times, and that 21 students presented themselves: 9 from the Veterinary School, and 12 from the New Veterinary School; 5 out of the 21 students were rejected. In Glasgow the Board held two meetings, and 20 students were examined, 18 of whom paid their fees. Of the two who did not, one was previously rejected in December, 1873, for his first professional examination, and the other for the diploma of the College, he being one of those who came up under the old regulations. Of the 20 students, 4 were remitted to their studies. The letter also stated, that during the first meeting of the Board in Edinburgh, Mr. Sadler, assistant to Dr. Balfour, Professor of Botany, officiated, with the sanction of the other examiners, for Professor Dickson, who was detained in Glasgow by his academical duties. A draft was also enclosed, along with a statement of receipts and disbursements in connection with the examinations.

Professor Pritchard, referring to the latter part of the letter, said he thought it was irregular that one person should be submitted for another without the sanction of the Council.

Mr. Harpley asked the Secretary to refer to a conversation which took place at a previous meeting upon the same difficulty. He was under the impression that it was then arranged that, in case of the illness of one of the examiners, the examiners themselves should have the power of appointing, *pro tem.*, a gentleman to take his place, the result to be communicated to the Council, and to be dealt with by them.

Mr. Moore said that that had been acted upon in the present case.

The Secretary found, on reference to the minutes, that the Committee suggested that, in case of failure in the attendance of any member of the Court of Examiners from unavoidable causes, the Sub-Committee should have power to obtain assistance from some of the members of the Royal College, who would aid in the examinations, but who would not have any vote.

Mr. Fleming thought it would be as well, before taking further steps in the matter, to write to the Secretary in Scotland, and ask him by whose authority Mr. Sadler was allowed to act.

The Secretary drew attention to the fact, that it was explained already in the letter that he had officiated for Professor Dickson, with the sanction of the other examiners.

The matter was then allowed to drop.

A letter from Mr. James Rowe, jun., Hon. Sec. to the Central Veterinary Medical Society, thanking the Council for the use of the Board-room during the past year, and renewing the application for the same during the ensuing twelve months.

The application was granted.

Report of Examinations (Scotland).

The Secretary read the Report of the several meetings of the Scottish section of the Court of Examiners held in Edinburgh and Glasgow on July 20th, 21st, and 22nd, on those who presented themselves for their "First Examination."

The Obituary Notice was read.

Finance Committee.

The Finance Committee reported that the vouchers and receipts for the preceding quarter had been examined and found correct. The quarterly balance-sheet and Treasurer's account was submitted, from which it appeared that the present liabilities amounted to £91 12*s.* 8*d.*, which the Committee recommended should be discharged, leaving a balance in hand of £477 6*s.* 0½*d.*

The Treasurer explained that there was a discrepancy in the balance account with regard to the interest computed by the bankers. It was stated to be £6 0*s.* 4*d.*, but was afterwards reduced to £1 11*s.*, which would be corrected at the next meeting.

It was moved by *Professor Pritchard,* and seconded by *Mr. Fleming*—

"That the report and quarterly balance-sheet of the Treasurer's accounts be received and adopted."—Carried.

Cheques were ordered to be drawn for the current expenses, and for the examiners' fees and insurances at Christmas.

Proposed Charter for the Royal Veterinary College.

Mr. Gowing called the attention of the Council to an advertisement which had appeared in the daily papers some weeks since, from which he understood that it was the intention of the governors of the Royal Veterinary College to apply for a Charter. He was not aware what the Charter pertained to, but he hoped, in good faith, that it would not interfere in any way with the rights and privileges of the Charter of the Royal College of Veterinary Surgeons. He understood also that there had been a Committee formed, of which Professor Simonds was the Acting Secretary. He should be glad if Professor Pritchard, in the absence of Professor Simonds, could give the Council any information on the subject.

The Chairman said that the advertisement alluded to appeared in the *Daily News* of the 28th July. At the opening of the Session of the Royal Veterinary College on the 1st of October, he asked the Principal if he could give him any information on the subject, as it was probable the question might be raised at that meeting. His reply was, that they were endeavouring to obtain a charter of incorporation chiefly for the endowment of scholarships, and for the general protection of their property. That was the only reply he had received, but the Principal promised that if anything else transpired in the matter antecedent to the present meeting of Council, he would write and give information respecting it.

Mr. Harpley suggested that application should be made to the Home Office or the Board of Trade for a copy of the proposed Charter, in order that the Council might have an opportunity of reading it over with the view of ascertaining whether there was anything in it which would interfere with the rights and privileges of the Royal College of Veterinary Surgeons.

Mr. Gowing, referring to the proposal made by Mr. Harpley to obtain a copy of the proposed Charter of the Royal Veteterinary College, Camden Town, from the Home Office or the Board of Trade, said he thought that the Council should, out of courtesy, apply to Professor Simonds for a copy, as he was sure the Council had no desire to distrust either Professor Simonds or the College.

Mr. Harpley was of the same opinion.

Mr. Withers also concurred, and suggested that a committee should be appointed for the purpose of watching over the matter. It seemed, he thought, an extraordinary thing that one of the public schools should seek a separate charter.

Mr. Fleming thought that, as the only communication the Council had on the subject was a private conversation between the President and Professor Simonds, the most judicious way would be to inquire whether such a step had been taken, or was about to be taken, by the Royal Veterinary College, and also with what object a charter was sought. He contended that the Council was responsible not only for the present, but also for the future welfare of the profession, and that it should therefore carefully consider any attempt to establish what might be called a Corporation within a Corporation. He did not think that the Royal Veterinary College would consider it any impertinence on the part of the Council to make such an inquiry.

Mr. Hunt having expressed himself as being of the same opinion, it was agreed that the Secretary should write to Professor Simonds, in accordance with the suggestion made by Mr. Fleming.

College Fund.

The Report of this Committee stated that, since the last meeting of Council, circulars had been issued to every member of the profession in the United Kingdom. Among the names of recent subscribers was that of Mr. W. Field, London, who had presented the sum of one hundred pounds; 29 additional subscribers had been added to the list, making a total of 123. The subscriptions received during the last quarter amounted to £290 11*s.*, leaving a balance at the bankers' of £1037 17*s.* 11*d.* The subscriptions promised, but not yet received, amounted to £136 16*s.*; and this, added to the balance in hand, would make a total of £1186 4*s.* 11*d.* The Committee recommended that a certain sum of the above amount should now be invested in government securities, and that trustees should be appointed until a sufficient sum was accumulated to enable the Council to obtain suitable premises. The Committee were of opinion that if the promised subscriptions were called in, the Treasurer would be enabled to purchase such an amount of stock as would realise a good sum for the money invested.

Mr. Withers (the Treasurer) stated that there was £600 upon deposit, and a balance of £437 15*s.* 4*d.* at the bankers'; making a total of £1037 15*s.* 4*d.* in hand. It was for the

Council to appoint trustees, and invest what amount they thought proper.

Messrs. Field, Cartwright, and Balls were then elected Trustees to the College Fund. It was also agreed to leave it to the Finance Committee to invest whatever amount they deemed proper.

House Committee.

The Secretary read a correspondence from Messrs. Frere and Co., solicitors, stating that Mr. Prideux had handed to them a copy of his letter of November last, applying for a renewal of the lease of the College, and that they could not advise their client to alter the terms at the expiration of the present lease; that if an agreement for three years was entered into, the rent would be £100 per annum; but if a renewal for seven, fourteen, or twenty-one years was asked, no increase in the rent would be asked for. Mr. Prideux, after having called upon him (the Secretary), requested that a short letter be written, with instructions to have the agreement prepared for the new tenancy of the College. With the sanction of the President a letter was accordingly sent. The President considered the solicitor's letter for the renewal of the lease reasonable, and entertained the hope that in three years the Council would be enabled to secure more convenient premises.

The Report stated that the above facts were laid before the Committee at its meeting of the 7th October; and that they had considered the agreement as prepared by the solicitors, and could see no reasonable objections to the terms proposed.

It was agreed, on the motion of Mr. Harpley, seconded by Mr. Gowing, that the agreement should be at once submitted to the solicitor to the College, previous to its being accepted by the Council.

Christmas Examinations.

It was agreed that the examinations should take place, as usual, at Christmas.

The Case of Alfred Jay.

Mr. Fleming called attention to a report he had observed in the *Times* police news, of the 14th of September, of one Alfred Jay, described as a veterinary surgeon and jobmaster, who was brought up before a magistrate on a charge of fraud. He was also charged with beating a woman, and with breach of promise. He (Mr. Fleming) wished to know whether the

individual in question was a member of the Royal College of Veterinary Surgeons.

The Secretary having referred to the Register, said that no such name appeared upon it.

Mr. Fleming said it was necessary that the public should be informed, when people of that description were brought before magistrates, that they were not members of the profession. He thought that the Secretary should be instructed to watch cases of the kind in the papers, and whenever he saw any one falsely styling himself a veterinary surgeon, he should be empowered to contradict it.

A Superior Degree in Veterinary Medicine.

Mr. Fleming gave notice that, at the next meeting, he should take the opportunity of bringing before the Council the question as to the desirability of the Royal College of Veterinary Surgeons granting a higher degree in Veterinary Medicine than was at present conferred by the Charter.

In reply to *Mr. Moore,*

Mr. Fleming said that this degree would be open to all members, whether present or future.

This concluded the business.

ROYAL COLLEGE OF VETERINARY SURGEONS.

COLLEGE FUND.

The following additional names of Subscribers to the College Fund have been added to the list since its publication in the last month's *Veterinarian :*

	£	*s.*	*d.*
Mr. James Clark, Cupar Angus, Perth . .	1	0	0
— Thomas Corby, Hackney . . .	2	2	0
— Osborn J. Hills, Leamington . .	5	0	0
— John Howard, Woolwich . . .	1	1	0
— W. J. Moore, junior, Army and Navy Club .	10	10	0
— William Penhale, Barnstaple . .	1	1	0
— William Penhale, junr., Holsworthy, Devon	1	1	0
— F. H. Wragg, Whitechapel . .	10	10	0

Subscriptions may be sent to the Secretary (Mr. Wm. Henry Coates) either by Post Office Orders, made payable at the District Post Office, High Holborn, or by Cheques

crossed Sir Samuel Scott, Bart., and Company, London. An official receipt will be forwarded in return.

The amount now in the banker's hands is £1116 19*s.* 11*d.*, which added to the sum of £80 15*s.* promised, but not yet received, makes a total of £1197 14*s.* 11*d.* The Council have authorised all the funds to be invested in Government Securities in the names of three Trustees of the College.

Veterinary Jurisprudence.

ACTION AGAINST A RAILWAY COMPANY FOR THE VALUE OF A HORSE.

The Great Northern Railway Company has lately been sued, in the Wakefield County Court, by a farmer for £50, the value of a horse killed on their line. On the 8th of August a man was riding the horse over a railway crossing, when an engine came up, and the horse was knocked down and killed, the rider escaping unhurt. It was proved, however, that the rider might have saved the horse if he had tried, but that instead of doing so, he dismounted and left it, and so the case was given in favour of the Company. In the event of the man remaining on the horse, would the Company have paid his funeral expenses?—*Land and Water.*

ROYAL VETERINARY COLLEGE.

The following Students of the Royal Veterinary College have been appointed Monitors during the Winter Session:

Class A.

Mr. E. Rivett	Blundeston, Suffolk.
— G. Goodacre	Keyham, Leicester.
— W. Lodge	Carleton, York.
— A. Hoole	Sheffield.

Class B.

Mr. W. R. Hagger	Ashdon, Essex.
— W. Dixon	St. Helen's, Lancashire.
— F. S. Oatway	Bideford, Devon.
— W. A. Hurrell	Southminster, Essex.

The following have been elected CLINICAL CLERKS for the *First Term* of the Winter Session:

Mr. R. Thompson	Durham.
— H. Muffitt	London.
— C. Gresswell.	Louth.
— J. H. Steele	Army?
— G. Farrow	Durham.
— H. Baker	Longton.
— F. T. Oatway	Bideford.
— T. R. Williams	Abergele.
— W. A. Hurrell	Southminster.
— J. F. Oliver	Derby.

List of Freshmen who have passed the Matriculation Examination and entered on their studies at the Royal Veterinary College:

Mr. Wm. Markham.
— Wm. Coupe.
— C. H. Thomas.
— W. Graves.
— S. Hill.
— H. Darley.
— A. Fisher.
— A. Brooks.
— E. Garton.
— F. W. Phelan.
— J. H. Bryars.
— J. E. Ainsworth.
— A. Wheatley.
— G. A. Banham.
— W. D. Straw.
— R. Moreton.
— A. Ball.
— W. Awde.
— H. Goule.
— J. Pook.
— F. P. Smith.
— E. M. Davy.
— T. S. Faulkner.
— W. D. Gunn.
— A. H. Brooks.
— T. R. Prime.
— L. C. Tipper.
— W. Mole.
— F. G. Reynolds.
Mr. H. Moore.
— J. Rose.
— W. F. Peacock.
— J. E. Overed.
— M. C. Yaxley.
— C. Clubb.
— W. Garrard.
— J. Cooper.
— G. J. Brooker.
— C. G. Poulton.
— J. Atkinson.
— J C. Bennett.
— G. S. James.
— H. T. Challinor.
— A. W. Mason.
— F. T. Hart.
— J. Moore.
— J. Holmes.
— C. Kerry.
— J. T. Smith.
— J. F. Fyrth.
— E. Smith.
— A. B. Daniel.
— P. Vincent.
— A. C. Greening.
— J. Squire.
— J. Mason.
— F. Cann.

The following Freshmen have also been admitted on Certificates in lieu of the Matriculation Examination :

Mr. T. J. Marriott.
— F. R. Fishbourne.
Mr. J. T. Frazer.
— Chas. S. Syrett.

Freshmen who in addition to qualifying in the obligatory subjects also passed an examination in the undernamed voluntary subjects :

Mr. E. Garton, *French.*
— J. H. Bryars, *Higher Arithmetic.*
— G. A. Banham, *Chemistry, Botany, and Higher Arithmetic.*
— R. Moreton, *Geography.*
— F. P. Smith, *Latin.*
— E. M. Davy, *Geography and Higher Arithmetic.*
— W. D. Gunn, *Higher Arithmetic.*
— A. H. Brooks, *Higher Arithmetic.*
— T. R. Prime, *Chemistry.*
— W. Mole, *Chemistry.*
— F. G. Reynolds, *Geography and Higher Arithmetic.*
— H. Moore, *French and Higher Arithmetic.*
— G. J. Brooker, *Higher Arithmetic.*
— J. Atkinson, *English History, Geography, and Higher Arithmetic.*
— A. W. Mason, *English History and Geography.*
— J. Holmes, *Latin, French, and Higher Arithmetic.*
— J. Squire, *English History, Geography, and Higher Arithmetic.*

OBITUARY.

We regret to have to record the death of Mr. William Henry Kent, M.R.C.V.S., of London. His diploma bears date August 12th, 1846.

Also on October 24th, at Rookley, Isle of Wight, Mr. James Wheeler, M.R.C.V.S., of Newport, aged 31. His diploma bears date April 19th, 1869.

ERRATUM.

In our notice of the appointment of Port Inspectors, published at page 767, October number, the name of Mr. Alfred George Leaney was incorrectly given as Alfred George Leary.

THE

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Communications and Cases.

HOW IS THE CONTAGIOUS PLEURO-PNEUMONIA OF CATTLE SPREAD?

By George Fleming, M.R.C.V.S., Royal Engineers.

A leading article in the *Veterinarian* for October, headed "The Contagious Nature of Pleuro-pneumonia," after describing and commenting on a few experiments which have been performed, evidently with the view of ascertaining some of the channels by which the contagium of that disease reaches the blood, concludes with the very startling statement: "It is thus conclusively proved that pleuro-pneumonia does not extend the area of its existence by any of the ordinary means which cause the spread of infectious disease."

Now, considering that this malady is one of the most insidious and destructive of any to which the domesticated animals are liable; that it has prevailed continuously in this country for more than thirty years; that it has been known on the continent of Europe for much more than a century, and has been most carefully studied by the most competent veterinarians of Germany, France, Belgium, Holland, and other countries; and that legislative measures have been everywhere enforced against it, on the supposition that it is a contagious disease, and extends its area like other contagious or infectious maladies, it is, to say the least of it, perplexing and vexing to think that we are only now beginning to institute experiments, and that these have resulted in the conclusion above stated.

Perplexing it will certainly be to those veterinarians who

do not care to closely examine the experiments, and who have not had much experience of the malady; but it will prove far more perplexing to agriculturists, cattle-dealers, legislators, and local authorities, and may even give rise to loud protests against the measures in force for the extinction of the disease. Indeed this has already occurred; as I observed in a daily paper, published during the last week in October, that the chairman of a local board referred to these experiments and to this conclusion, and appeared to think that it was useless, nay, wasteful, contending with such a disease.

Nothing could be more lamentable than a result of this kind; and undoubtedly the writer of the article did not for a moment intend it to be understood that the malady was not, and could not, be suppressed like any ordinary contagious disease; or that there was anything mysterious or doubtful about its contagiousness, or rather its infectiousness. If he did, he is certainly scarcely justified in drawing such a conclusion from his experiments, as a brief criticism of them will I believe prove; and as this subject is of more than ordinary importance, and one that has been allowed, strangely enough, to lie aside in this country, I am hopeful that the experimenters and the writer of the article in question will not consider me captious, hypercritical, or animated by any but the most laudable intentions, in examining the ground upon which they base such an alarming and embarrassing statement. At the same time, I shall ask to be pardoned if I refer to some points in connection with the contagiousness of this disease which have been explained on the Continent, but which do not appear to be known in this country.

First, with regard to the experiments referred to in the leading article. Nine animals were subjected to them, exclusive of some which had mucus from the respiratory organs of diseased cattle rubbed upon the mucous membrane of their nostrils, and of which notice will be taken presently. Of these nine animals seven were bovines and two were sheep; but as the disease is not transmissible (to my knowledge) to the ovine species, we are warranted in excluding them from our observations, so far as the communicability of pleuro-pneumonia is concerned. One animal (a heifer calf) died from blood poisoning in six days; so that may also be excluded. This only leaves six animals. One of these (a steer) was exposed to the inhalation of the vapour of diseased lungs until decomposition was commencing in them; and the animal was kept under observation for ten weeks without showing signs of the malady.

Into the nostril of another animal, a sponge which had been allowed to remain until it had become thoroughly saturated with the breath and mucus of a sick beast, was kept for upwards of half an hour. This animal was watched for *several* weeks, but did not offer any symptoms of infection. A heifer calf had two drachms of serous exudation from the lung of a diseased cow injected into the left lung; and another calf had a like quantity injected into the left jugular vein. Five months afterwards these were in good health.

In other two young animals six drachms of exudation from diseased lungs were injected: in one into the lung, in the other into the windpipe. In both, local pulmonary disease was noted in a fortnight; and in another fortnight one died, and the second was killed. Their lungs appear to have been affected; but it is stated that these organs were free from those lesions peculiar to pleuro-pneumonia.

I think these two cases should also be excluded from estimation; as the animals perished in a month, and the disease in the lungs was, in all probability, produced by irritation set up by the large quantity of fluid, perhaps not fresh, introduced in this manner into them. At any rate, the two instances can scarcely be received as proving anything of a negative or positive character with regard to the malady: particularly if the brief interval of only a month be taken into consideration.

The calf that died from blood-poisoning ingested half an ounce of the exudation, which contained *bacteridia*. This also, as before mentioned, cannot be included; but it may be useful, and perhaps novel, if I remark that, in 1868 and 1869, experiments were instituted at Alfort with a view to discover if the contagium obtained access by the digestive organs, and for this purpose portions of diseased lung, as well as several pints of effused serum (fresh), were administered to healthy cattle without producing any result.

With regard to the nasal mucus, it has long been recognised that this does not contain the virus.

We are, therefore, left with but four cases to found any conclusion upon. That which inhaled the vapour of diseased lungs was only under observation for ten weeks; the latent period of the disease is sometimes four and five months. The same remark applies to the cow which had the sponge placed in its nostril; it was only under observation for *several* weeks. The two calves which escaped infection received the fluid by the jugular vein and through a puncture in the lung. But we have no proof that the malady is ever transmitted in this manner in a natural way. There are other contagious

diseases, which all experience proves to be highly infectious, and which cannot be so induced. Are young animals, and particularly calves, more susceptible to the infection of pleuro-pneumonia than adults? Has any account been taken in these experiments of the somewhat large proportion of animals which do not take the disease when exposed to natural infection: sometimes amounting to more than twenty per cent.? Only two of the experiments enumerated were at all likely to produce anything like positive results, and the fact that they did not do so is next to valueless. If we read the history of glanders, and the experiments undertaken to prove its non-contagiousness both by ingestion and inunction of the mucous membrane, as has been attempted in the above experiments in pleuro-pneumonia, we will find a lesson that must teach us to beware of drawing erroneous conclusions from insufficient observations. Glanders can be produced through both channels; and so may pleuro-pneumonia, so far as these experiments go. I, however, do not assert that it will; I am only of opinion that the experiments are inconclusive in the highest degree, and cannot be received as proving anything either for or against the infectiousness of pleuro-pneumonia.

No fact in the whole history of contagious maladies is better established, than that the disease in question extends the area of its existence by the ordinary means which cause the spread of infectious diseases, viz., by contact and cohabitation of infected with healthy cattle on roads, railways, ships, pastures, cowsheds, &c., and through the medium of forage, straw, &c., which have been soiled and breathed upon by diseased animals, the utensils which have been used with them, as well as the persons who have attended upon, or been in contact with, such creatures. Daily observation and clinical experience in nearly every part of the world have afforded overwhelming proof of this.

Not only is such the case with the disease produced accidentally or in a natural manner; but it has also been demonstrated experimentally, though in another way to those described above. In France and Germany, cattle have been infected through contact with others which were suffering from the local inoculations practised upon them as a protective measure. This has occurred in the experience of Reynal, Voigtlænder, Lenhardt, and others; these have also proved the identity, pathologically and histologically, of the local inoculations with the naturally induced disease.

The very extensive and carefully conducted experiments carried out at Alfort in 1850, under the direction of Magen-

die and the most distinguished veterinarians in France, settled for ever the question as to the contagiousness of this disease by contact and cohabitation; and time has amply added to the testimony then adduced. With such evidence we scarcely now require experiments to prove the communicability of the affection, by injecting the exudations into the blood or lungs, &c.

It is sufficient, so far as legislative measures are concerned, to know that it is spread by the contact of the diseased with healthy cattle; and that in proportion as the facilities for this contact are multiplied through carelessness, the absence of any kind of organization, or erroneous notions as to the nature of the malady, so will it extend and be maintained.

Experiments with contagious diseases are not always uniformly successful; indeed, from various causes, they are seldom to be relied upon, unless carried out on a sufficiently extensive scale, and with every regard to the specific nature of the malady. This has not been done in those experiments we are now criticising.

Our knowledge of the malady should at the present day be pretty well based on the trustworthy observations of many years; and it leads us to consider the infecting principle of pleuro-pneumonia as existing in a "fixed" and "volatile" condition, being most active in the air expired by a sick animal, and present also in the lymph-exudat. It is likewise present in the cutaneous emanations, and probably in the secretions and excretions, as well as the blood. It is produced during the whole course of the malady, but is most abundant and virulent during the febrile stage. This contagium is variable in its volatility and potency, like some other contagia; and the malady it produces is somewhat eccentric when it appears among a number of cattle: generally affecting only a few at a time, and lingering for a long period among them.

As a rule, it is only what we have termed the "volatile" form of the contagium which produces the disease; and it is quite exceptional that what we have designated the "fixed" form, when inoculated, gives rise to the special pulmonary and pleural alterations described as pathognomonic of the malady. If it always did, then protective inoculation would be a remedy as bad as the disease itself.

There is no proof that the nasal mucus, saliva, &c., when rubbed into the mucous membranes of healthy animals, will produce the disease, neither will transfusion of the blood. This conclusion appears to have been arrived at a long time ago.

There is every probability that the contagium of the lung-

plague finds its way to the system by the respiratory passages, in order to produce the peculiar lesions in the pulmonary organs and thorax. Inoculation in various part of the body, with perfectly fresh lung-serum, certainly gives rise to general disturbance and to local alterations which, as has been stated, are shown to be analogous or identical with those observed in the lungs; but it does not, as a rule, produce the lung-disease.

It is, therefore, most probable that the virus is conveyed into the lungs in the act of inspiration, and, localising itself in these organs and their investing membrane, develops those morbid processes which prove, in the great majority of cases, so destructive.

If it is desired to prove or disprove the infectiousness of the disease once more, all that has to be done is to turn a sick animal among a number of healthy ones. We shall then find that the extension of the contagium occurs like that of any other infectious malady, though certainly not so promptly as aphthous fever or cattle plague.

By its contagious or infectious properties alone, it has within the memory of the present generation extended itself over nearly the whole world, and England has been chiefly to blame for this dissemination By these same properties, solely, it maintains itself in this country, and will maintain itself until different measures and different management are introduced. The present order of things will never extirpate it; and the compulsory slaughter clause will produce but little effect upon its spread. Indeed, this measure must be regarded as a great hardship so long as it is not applied to Ireland. In that country, it is well known, the disease is prevalent, and perhaps to a greater extent than is dreamt of; it is an essentially exporting country, and Irish breeders and graziers are different to those of any other nation if they will only export the perfectly healthy animals they have to dispose of. Surely if compulsory slaughter were required anywhere, it must be there. Port inspection to prevent the ingress of such a disease into Great Britain is of no value whatever, as scores of cattle may pass the closest scrutiny of the veterinary surgeons appointed to that office, and yet be in such a state of disease as to render their contact with healthy animals a sure source of extension of the malady.

[Our remarks on the contagious nature of pleuro-pneumonia have been entirely misunderstood by many persons. The disease spreads by cohabitation, and by cohabitation alone. See the "Report of the Experiments," as published in vol. x, part 2, second series, of the *Journal of the Royal Agricultural Society*.]

REVISED LIST OF ENTOZOA, WITH NOTES AND REFERENCES.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Professor in the Royal Veterinary College.

(*Continued from p.* 645.)

So intimately connected with the parasites of animals are the very similar and in some instances the very same entozoa infesting man that, on reconsidering the subject, I propose to include the human helminths in the present catalogue.

14. The Pork Tapeworm (*Tænia solium*).—I gave this species the English title here prefixed, in order to mark the fact that it is derived from the pig. Its specific Latin name implies that it only occurs singly, which is not the case. It is still frequently, and equally erroneously, termed the common tapeworm in this country, whereas it is of very much less frequent occurrence than the cestode derived from beef. The worm is readily recognised by the armed head, which usually supports twenty-eight hooks arranged on the prominent proboscis in two circular rows. The so-called body frequently attains a length of from twenty to twenty-seven feet, its segments or proglottides being distinguished by the comparatively small number of uterine branches, namely, from seven to ten on either side of the middle line.

Bearer.—This parasite, in the full-grown state, has hitherto only been seen in the human body.

Specimens.—Very few examples exist in the museums of the metropolis, although a great many of the Tæniæ in our collections are labelled as belonging to this species. I have only obtained one head of this species.

Illustrations.—Carefully figured by Küchenmeister, Leuckart, Davaine, Blanchard, myself, and others. Also recently by Professor G. Fritsch, in the *Berliner Klinische Wochenschrift* of Sept. 14th, 1874, p. 462.

Experiments.—The first of the kind, proving the true source of this parasite, were performed by Küchenmeister; his results being subsequently verified by Leuckart, Van Beneden, Haubner, and others.

15. The Beef Tapeworm (*Tænia mediocanellata*).—This cestode is readily recognised by the fact that the head is not furnished with hooks whilst the position of the proboscis is occupied by a small retractile disk, which has been described as a fifth or supplementary sucker. It is a stouter and broader

species than the above, but rarely attains a length of more than twenty-three feet. The uterine branches of the sexually mature proglottides are comparatively numerous, varying from ten to nineteen on either side of the main duct.

Bearer.—This parasite is only known to infest the human body in the adult state, in whom it occasionally gives rise to severe symptoms.

Illustrations.—Figured by Küchenmeister, Leuckart, Davaine, Thudichum, myself, and others; and also by Fritsch, as above cited.

Specimens.—Almost every anatomical museum in the metropolis contains specimens; particularly fine examples occurring especially in the pathological collections connected with Guy's, St. Thomas's, the London and the Middlesex Hospitals. The Hunterian Museum and that of the Royal Veterinary College also contain numerous choice specimens.

My private cabinet includes a large number of the heads of this worm, taken by myself chiefly from patients coming from India. In the *Lancet* for June 6th, 1874, I gave an analysis of eighty cases of supposed tapeworm, the majority of which were referable to this species. Quite recently I obtained two heads belonging to two examples of this parasite, both of which infested an Indian officer who was under my care.

Experiments.—The first helminthologist who reared this worm by feeding cattle with the proglottides was Leuckart. His success was quickly verified by Mosler, and also by myself and Professor Simonds at the Royal Veterinary College. Very lately further confirmation has been obtained by Professor St. Cyr, of the Veterinary School at Lyons.

16. The Mutton Tapeworm (*Tænia tenella*).—I have in my collection several examples of a very delicate human tapeworm, which I believe to be referable to an armed cestode derived from the ingestion of mutton affected with measles. The uterine branches are more widely apart than they are in the pork tapeworm, and the proglottides are smaller and narrower.

17. The Ridged Tapeworm (*Tænia lophosoma*).—In the museum connected with the Middlesex Hospital Medical College there is a human tapeworm (destitute of the head) which has the reproductive papillæ uniserially disposed along one side of the body of the worm throughout; and, in addition, there is a uniform ridge on the same side of the chain of segments. Its larval source is unknown, and no second specimen appears to have been described.

18. The Spotted Tapeworm (*Tænia flavopuncta*).—As in the species above described, this cestode has the reproductive papillæ serially disposed all along one side of the body, but it seems to be quite distinct from the ridged form. Its distinctive name was given to it by Dr. Weinland, in consequence of the presence of minute yellow spots occurring in the central line of the body, one in each successive joint. Six specimens of this worm, which probably only measures about a foot in length when perfect, are contained in the Boston Medical Improvement Society's Collection. These parasites were taken from an infant, and no second instance of its occurrence has been placed on record.

19. The Dwarf Tapeworm (*Tænia nana*).—A third species of cestode having the uniserial arrangement of the external reproductive outlets is the still smaller human cestode discovered by Dr. Bilharz in Egypt; and this worm also, so far as I am aware, has only once been detected in the human body. The entire parasite is only an inch in length; nevertheless, it carries as many as 150 segments or thereabouts. The head is armed with hooks, but its cysticercal source at present remains unknown. It is an interesting circumstance to find, that in the only case on record, occurring in a boy who died with cerebral disease, this parasite existed in prodigious numbers. From this I think it may be inferred, that the larvæ are very likely to be polycephalous in character. Leuckart thinks they reside in insects.

Illustrations.—Figures have been given by Von Siebold and Bilharz, and also by Leuckart.

20. The Broad Tapeworm (*Bothriocephalus latus*).—This cestode is readily distinguished from all the ordinary tapeworms by the circumstance that the head is supplied with only two laterally disposed depressions, which have not the character of genuine sucking disks; and, moreover, the mature joints of the body have their reproductive outlets placed in the central line of the body, where they stand out conspicuously, being backed, as it were, by dark-coloured uterine rosettes. It attains a length of from twenty-five to forty feet, or even more, supporting several thousand segments. At present its larval source is a matter of conjecture.

Bearer.—Frequently infesting man in certain parts of Europe, and occasionally found in the dog, occupying the small intestine.

Illustrations.—Figured by Eschricht, Küchenmeister, Leuckart, Knoch, Davaine, myself, and others.

Experiments.—Dr. Knoch conducted a series of feeding experiments on dogs, and thought that he had succeeded in rearing this cestode from the six-hooked embryos. At present we are unacquainted with the measle-condition of the worm, which, as conjectured by Leuckart, may reside in fish of the salmon and trout family.

Specimens.—These occur in several of the pathological museums of the metropolis, and also in the Hunterian Collection. That of the Royal Veterinary College possesses a fine specimen obtained from a dog. In my private cabinet are several examples, for one of which I am indebted to Dr. Arthur Leared, who recently obtained it from a patient.

21. The Cordate Tapeworm (*Bothriocephalus cordatus*).—This entozoon derives its name from the circumstance that its head is more or less heart-shaped. It is a much smaller species than the above, attaining a length of about one foot. The neck is but slightly developed, the mature segments of the body being very narrow and closely set together.

Bearer.—Infests man in Greenland occasionally, being more common in the dog, the walrus, and various species of seal.

Illustrations.—Most of the figures that have appeared are copies from the original drawings by Leuckart, of specimens transmitted to Professor Steenstrup.

22. The Crested Tapeworm (*Bothriocephalus cristatus*).—This worm, which measures between nine and ten feet in length, is, according to Dr. Davaine, characterised by the presence of two remarkable crest-like prominences, which together form a sort of rostellum or proboscis, covered by numerous minute papillæ. The full-grown segments are less than half an inch in breadth; the body of the parasite being much narrower than that of the broad species.

Illustrations.—Figured by Dr. Davaine in his recent article on the cestodes in the *Dictionnaire Encyclopédique des Sciences Médicales.*

Specimens.—In addition to the two specimens on which Davaine's description is founded, there is a preparation containing several examples of a species of human Bothriocephalus in the museum attached to the Westminster Hospital Medical College, which I believe to be referable to this parasite.

SPECIMENS OF INTESTINAL CALCULI PRESENTED TO THE MUSEUM OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

We are indebted to Mr. Coates, Secretary to the College, for the following particulars relating to these specimens.

At the last meeting of the Council, Mr. M. E. Naylor, M.R.C.V.S., of Wakefield, presented to the Museum of the College some interesting specimens of calculi. The largest of these, which was taken from an aged horse, has been photographed. The animal had been in the possession of Messrs. Sugden and Sons, millers, for upwards of ten years, during which time he was, with other horses of the firm, under the professional care of Mr. Kirke, V.S., of Huddersfield.

The horse died in consequence of being accidentally thrown down in the double shafts of a waggon, but without sustaining apparently any serious injury at the time. Subsequently he presented symptoms of ill health, which, however, did not assume any special form.

On a *post-mortem* examination being made three calculi were found in the colon, which was much enlarged and thickened in its coats. The largest calculus was ovoid in form, and when first removed weighed 25½ pounds, but is now reduced to 24½ pounds.

The striking peculiarity in connection with this case is, that two other calculi were found close to the small end of the larger one, which had an appearance of having been rubbed against its surface, the effect being that they had been ground into the form of oblong bodies, having double concave and convex surfaces. Had the animal lived these calculi would in time have been worn quite through, as they were remarkably thin towards their centre.

Of two other specimens of calculi presented by Mr. Naylor, one was taken from a carriage-horse, the property of Mr. Thompson. The animal had been employed for carriage work by its owner for two years, during which time he voided two small globular-shaped calculi. As the animal had grown too gross for carriage work, he was transferred to the mill, where at short intervals he voided without pain two more, but rather larger calculi, which were found in the fæces.

About a year afterwards the horse had several attacks of colic, which however gradually subsided under treatment.

Mr. Naylor further states that he was summoned one morning in haste to this horse, when the following symptoms, among others, presented themselves: pulse scarcely perceptible, body tympanitic and bedewed with cold clammy sweats.

Anodyne-stimulants and enemas were administered, and hot fomentations applied to the abdomen, but without benefit.

Post-mortem examination.—The abdomen was found to contain a quantity of fluid and half-digested food, which had escaped from a rupture of the colon, which existed to the extent of eight or ten inches near its sigmoid flexure. On removing the intestines a large calculus was found in the abdomen. This calculus, of which a section has been made, weighs $10\frac{1}{4}$ pounds.

The next case was that of a donkey, well known in Wakefield, the property of a milkman, which for fourteen years acquired notoriety for its docile habits in waiting for his master at the appointed stations throughout the town.

This animal suffered from an attack of indigestion, with obstruction in the bowels. It however recovered, and was enabled to return to its work. About a month afterwards it had another and more serious attack, to which it succumbed in about two days.

On a *post-mortem* examination an oval-shaped calculus weighing about two pounds was found impacted in the rectum.

I may add that Mr. Naylor procured the larger calculi for the purpose of placing them in the Museum of the College.

CONTAGIO-INFECTIOUS PLEURO-PNEUMONIA.

By William Alleyn Cox, M.R.C.V.S., Staff Inspector, Londonderry.

I have before mentioned that blood when drawn in the commencement of this disease is very dark in appearance. This is not owing to its being loaded with carbonic acid, from the deficient action of the lungs, as at this period we often find, on auscultating the chest, that instead of defective, there is increased vesicular action, but without doubt the colour is due to the presence of carbonic acid, most probably in a free state. The blood coagulates as quickly as it is drawn, and the coagulum, instead of being of the consistency of jelly, is tough and stringy, and the serum is proportionably

very small in quantity. It is known that fibrin is the ordinary coagulable constituent of the blood, and from the size of the clot, and from its tenacious character, it may be argued that it is relatively in excess.

This disease has been spoken of by some as inflammatory; this theory is not correct. In sporadic pleuro-pneumonia, which is inflammatory and non-contagious, the blood when drawn coagulates slowly, and there is a considerable excess of serum; the pathognomonic symptoms too are very different, but this will be pointed out hereafter. The advocates of the inflammatory theory point to the effusions found in the cavity of the chest, to the flocculi of lymph, to the adhesions between the pleural surfaces, and to the consolidated condition of the lungs; but these, one and all, arise from the changed state of the blood, and not from true or pure sthenic inflammation, and this will be found to be borne out by the symptoms.

Prior to its coagulation blood is said not to contain actual fibrin, but that it is formed by the union of two substances, which, however alike in their elementary nature, may differ in quantity, or relative excess, or deficiency. If either of these conditions exist, there will be an alteration in the size and condition of the clot.

The white corpuscles, which are endowed with movement, without doubt have a tendency to aggregate, and under various circumstances are greatly increased in number. As the disease advances, the blood when drawn is of a maroon colour, although at this stage, the cells of the lungs being blocked up, we might expect to find it darker. This alteration in appearance is due, either to an increase in the white corpuscles, owing to their non-conversion into the red or blood-cells, or to a great development of molecules or granules. Both these changes take place, but there is a correspondingly greater increase in the latter; these are endowed with greater movement, simulating vitality, owing to the action of the virus upon them; besides this they have within themselves the elements of reproduction, and this takes place with great rapidity.

The clot at the advanced period is less firm, apparently owing to the deficiency in the amount of fibrin, or rather the constituents of it, these being diverted to and thrown out into the viscus to which the disease is determined. The serum is opaque, even turbid or milky, and similar in appearance to the albumen of an egg, when undergoing the first stage of decomposition. Whether this opacity is owing to some change or excess in the amount of albumen, or to a great increase in

the number of the molecules, has yet to be determined, but I think it is most probably the latter.

These appearances plainly indicate that a cessation in the formation of the blood has taken place, apparently half way. The white cells are found to be in excess, but are not further developed; the relative quantity of albumen is increased, but its conversion into fibrin is retarded or imperfect, as evidenced by the peculiarity of the clot; this increase is the result of the introduction of a ferment, or the formation of one in the earlier stages. Nature endeavours to relieve this by increased functional activity, but after repeated efforts the system succumbs, having been gradually weakened, whilst making these extra exertions, by the supply of blood being of an altered or impure character. It is at this period, or immediately following it, when elaboration and appropriation of the blood has partly ceased, that we notice the change in its colour.

I have mentioned the term ferment; this is generally given to a principle capable of producing disease of a like or similar character, as that by which it is generated, and has the power of producing intestine movement in the structures into which it is introduced.

It may be said to include all those poisons which generate specific diseases, and has been written upon by the various names of virus, miasma, malaria, and others. The exhalations from diseased animals, as well as those thrown off by decomposing animal and vegetable matter, is in the form of spores and granules. These are semi-solid masses of organic matter of the most minute size, so small as not to be perceptible; they possess under certain circumstances rapid and constant motion, and when introduced into a locality favorable for their development they increase to a great extent. Such a locality is the blood; we have its viscidity, the heat of the body, the movement of the mass, and the presence of that material which is most easily acted upon by such a morbid agent.

As before said, these spores are thrown off during the existence of special disease, and if taken into the system of an animal whose idiosyncrasy is favorable to the development of disease, a malady is produced, varying in character according to the time of the year and state of the system. In most cases, however, the spores produce a disease similar to that from which they are derived, although not always of the same type. These spores, acting as primary ferment, increase the quantity, first of the albumen, and secondly of the free granules or molecules, and these I imagine in their

turn are rapidly reproductive; this is the only method by which we can account for the changed appearance of blood in the advanced stage. I shall, however, as early as possible, more thoroughly investigate the blood, in every stage of this disease. I will then communicate the result of my observations.

Whether these spores possess an active principle *per se*, or whether it is volatile, non-demonstrable—and in such a case they are *merely* the *carrier* of the disease—it is difficult to say; it is more probable the former. It is quite evident that they are in a peculiar condition susceptible of change, and that their great principle is that of increase; under the circumstances before mentioned, the determination or nature of the disease depends on their origin and on the co-operation of other agents.

The blood contains the necessary elements of a ferment—nitrogen and albumen—the latter being an azotized substance. This being the case, is it not possible that certain adventitious and favorable causes may without contagion superinduce this malady in a system prepared as it were for the development of disease? I think that the granules of the blood, when subjected to causes hereafter mentioned, are liable to be increased, and their determination—or nature of the disease—is a question of the state or condition of the animal at the time the cause comes into operation.

These granules are formed of fermentisable matter and would not require great stimulus to change, and on the cause of the change much of the nature of the disease would depend.

Particles of dust—inorganic matter—are carriers of disease, as the spores adhere to them in considerable number.

(*To be continued.*)

COMPULSORY SLAUGHTER IN CONTAGIOUS PLEURO-PNEUMONIA.

By the Same.

Your editorial remarks in the issue of November will be endorsed by all who are conversant with the disease. It is quite true that "half measures are of no use, and it would be almost as well to leave matters to take their course as continue our present leisurely proceeding." To be of *any* service, the steps taken must be *thorough*, and one system

must exist throughout the kingdom. From extensive practical acquaintance with the disease, I am convinced that compulsory slaughter is advantageous in all respects; but to make it completely effectual, it should be extended to Ireland. A knowledge that the presence of infected stock would interfere with the sale and removal of these animals has prevented numbers of stock-owners from reporting attacks of this disease. Without doubt it exists in localities of which the authorities have no knowledge. This is the cause of the exportation of diseased animals. A stock-owner having an animal affected does not report the fact, knowing that there is no compensation to be obtained, besides which he subjects himself to inconvenience from the restrictions. Fearing that the disease will affect the herd, he disposes of those that are *apparently* healthy, but which may have the malady dormant in the system, in which state it will remain undeveloped for —in some instances—many weeks. If twenty animals in such a condition were exported, and sold into as many large herds of healthy stock, the evil would be great, and this is often done. When the disease is latent or hidden, it is impossible to detect it. The use of the thermometer has been recommended; however trustworthy it may be as an aid to the diagnosis of general disease, or constitutional disturbance,it is useless in determining the existence of any particular malady.

I notice with great satisfaction that in a discussion which took place at Norfolk, at a meeting of the committee for carrying out pleuro-pneumonia orders, that this question was spoken upon at some length and with great knowledge, both by the Earl of Kimberley and C. S. Read, Esq., M.P. One remark was made by the Earl of Kimberley with which I most especially agree, viz. that there are cases of indigenous pleuro-pneumonia; but of this I purpose to speak in the concluding paper of article "Contagio-Infectious Pleuro-Pneumonia," now publishing in your Journal. It was further said by his lordship, that the Phœnix Park was, or had been, a hot-bed of disease.

This is owing to the defective system, not, however, with respect to the *actual* inspection of sick animals. The following remarks will clearly explain my meaning. If an animal is perceived unwell by the official in charge of the Park pasture, or by the owner, it is reported to the Constabulary, who in their turn report to the Veterinary Department, but I think the first report is seldom made until the animal has been ill several days. If found to be suffering from a contagious disease it is placed in a railed enclosure in the Park, but so

insufficient is it as a quarantine station that healthy animals can come in close contact with those affected.

The defect is, that *orders* are not given to the inspectors to visit infected places *frequently*, and *to examine stocks supposed to be healthy*. If thoroughly conversant with disease, they (the inspectors) would be able to see indications which would not be observed by the uninitiated; to take steps to isolate and remove suspicious cases, and to have them placed in such a situation that there would be no possibility of contact with healthy animals.

From an agist or ley pasture the disease is easily carried over the country; animals are taken away apparently sound, and free from disease—not really so—mingled with healthy home-stock, or sold to a fresh herd; thus the malady is spread, those in contact becoming affected, and in their turn affecting others.

To prevent the importation of all diseased animals the present "order" should be supplemented by another extending compulsory slaughter, with compensation to the "entire kingdom." There should be also rigid, rural, and district inspection, and in large towns frequent inspection of dairies and knackers' yards, and a strict enforcement of the law against offenders. The period of restriction should be extended in this malady, to the time fixed; thirty days is absurdly short; all animals that have been in contact with diseased should be horn-branded in the manner recommended in the article "Cattle Trade," and it would be advisable that they should be "fattened off;" all inconvenience and loss that the owner would suffer thereby being fairly valued and compensation given.

This last suggestion is very important, as neither compulsory slaughter nor inspection will entirely check disease, if animals with the seeds of the malady implanted within them are allowed to be exported, and I know of no method of prevention so simple as that above mentioned.

I have of necessity quoted largely from my article on the "Cattle Trade" published in your journal of September, but my anxiety to aid in every method to suppress these maladies must plead my excuse. In that article I entered somewhat fully into some of the subjects now mentioned. I cannot forbear saying, that were restrictions entirely removed or the order relating to compulsory slaughter and compensation suspended, this disease would again quickly be developed to an alarming extent.

THE PRINCIPLES OF BOTANY.

By Professor James Buckman, F.L.S., &c. &c.

(*Continued from p.* 797.)

We have now arrived at the third sub-class of Exogens as established by Professor Lindley, namely—

Perigynous Exogens,

which is founded on the fact that the stamens grow to the side of either the calyx or corolla; ovary superior or nearly so.

In this sub-class are arranged ten alliances, many of which contain some most useful natural orders, among which we may mention the *Legumenosæ* and the *Rosaceæ*, the first with its irregular corolla, the second with these floral organs of five distinct petals very regular, and compare these with the adhesive corolla of the Daphnods. This allocation points to large differences, but still the sub-class is very consistent, as may be seen from the following remarks of its founder. Professor Lindley, speaking of Perigynous Exogens, says:

"It is evident in the alliances thus collected there is a constant and powerful tendency to the cohesion of the floral organs, for half of them consists of orders having monopetalous flowers, a structure which is rare in the Hypogynous sub-class, and if it is seen there, is seldom accompanied by any union of the stamens to the petals, such an occurrence, when it is observable, as in Epacrids, being altogether exceptional. Here, on the contrary, the monopetalous corolla is habitually associated with epipetalous stamens. The tendency to adhesion is not, indeed, confined to the separate parts of the same ring of organs or to the stamens with the calyx or corolla, but also not unfrequently occurs between the ovary and the parts which grow around it, the consequence of which is that we find a partly inferior ovary in nearly every one of the alliances of the Perigynous sub-class.

"But although this is a manifest approach to the condition of the Epigynous class, yet it is seldom the cause of any confusion, because the combination of the calyx, corolla, and stamens with each other is only partial, and is rarely accompanied by a similar cohesion of the carpels, whose styles remain separate even when their ovaries are consolidated. This is

obvious among appleworts and hydrangeas, two quasi-epigynous forms of the Ranal and Saxifragal alliances."*

The first alliance in the sub-class will be the *Ficoidal one*, as follows:

Alliance XL.—FICOIDALES. THE FICOIDAL ALLIANCE.

Diagnosis.—Perigynous exogens, with monodichamydeous flowers, central or axile placentæ, a polypetalous corolla, if one is present, and an external embryo curved round a small quantity of mealy albumen.

Of these there are four natural orders, but we shall here only direct attention to two of them.

1st. MESEMBRYACEÆ—FICOIDS.—*Petals numerous, conspicuous; carpels several, consolidated.*

2nd. SCLERANTHACEÆ, SCLERANTHS.—*Petals absent, sepals united into a tube. Carpel single, solitary. Fruit inclosed in the hardened calyx tube.*

1. This order, which is wholly exotic, is well known to us through the showy examples of the genus MESEMBRYANTHEMUM of our gardens and greenhouses. Mr. A. Smith gives the following account of the genus, which we transcribe on account of its brevity and clearness:

"MESEMBRYANTHEMUM.—A most extensive genus of *Mesembryaceæ*, the name of which (derived from the Greek words *mesembria*, mid-day, and *anthos*, flower) is applied to these plants because many of them open their flowers only for a short time in the middle of the day. Between three and four hundred species are described, and upwards of one hundred and fifty are cultivated in our gardens, where some of them are favourites on account of their showy flowers. They are very succulent, and grow in hot sandy plains, the genus being almost entirely confined to the Cape of Good Hope. Their leaves are very variable in form, but almost always of a thick fleshy texture; and their flowers have four or five sepals united by their base and cohering with the ovary, and numerous narrow petals, generally in several series. The ovary is one or many celled, and bears numerous stigmas, and the one or many celled fruit opens by means of slits disposed in a star-like manner on the top, each cell containing numerous seeds.

M. crystallinum, a native of the Canary Islands and Greece, as well as of the Cape of Good Hope, is the common Ice plant of our gardens, so called in consequence of every part of the plant being covered with small watery frustules which glisten in the sun like fragments of ice. Large quantities of the plant are collected in the Canaries and burnt,

* 'Vegetable Kingdom.

the ashes being sent to Spain for the use of glass makers. *M. edule* is called the Hottentot's fig, its fruit being about the size of a small fig, and having a pleasant acid taste when ripe. The leaves also of several species are eatable, those of *M. pugioniforme* being a good substitute for spinach; but some, such as *M. tortuosum*, possess narcotic properties and are chewed by the Hottentots for the purpose of producing intoxication. The fruits possess hygrometric properties, the dried shrivelled capsules swelling out and opening so as to allow of the escape of the seeds when moistened by rain, which at the same time fits the soil for their germination."*

As we are fond of the *M. crystallinum* as a garnish for fruit, we grow a quantity of it every year, but in seasons of drought we have the greatest difficulty in guarding our plants from the attacks of sparrows, which, without protection, eat up the cool plants down to the very roots, probably with a view of quenching thirst, not only with the fluids of the plants, but also from the cooling properties of the saline matters which they are found to contain.

The 'Histoire Les Plantes Grasses' of De Candolle contains some magnificent engravings of many species of the genus, from which a notion may be gained of the diversity of form and colour presented by these charming plants, but most greenhouses will be found to contain many interesting specimens, which, while they are showy and curious, are comparatively easy of cultivation.

2. The *Scleranthaceæ* consist of a few genera only, which, again, are represented by a limited list of species.

The genus *Scleranthus* of our own flora contains two interesting species of what would ordinarily be called weeds, the one, *S. annuus*, local in arable land; the other, *S. perennis*, occurring very locally in upland pastures.

These are both known by the curious name of Knawell, for which the French is *Gnavelle*, the German *Wilde Knauel*. The *S. perennis* is said by Mr. Bentham "to so much resemble the *annual S.* that it is by some considered as a mere variety." And it may be that the annual or agrarian form is a derivative from the wilder one, and in this way it is thus probable that many purely agrarian weeds may owe their distinctive characters to a new mode of life, or so become "species" induced by circumstances.

The *S. annuus* occurs abundantly on our own farm, always on the completely littoral sands of the Inferior Oolite. It is, then, a weed which more particularly marks the arenaceous nature of the soil on which it grows. With us it occurs with

* 'The Treasury of Botany.

the *Spergula arvensis*, and both of these are indicators of a sandy condition. The *S. perennis* we have found sparingly on the sides of the Cotteswold Hills on the Inferior Oolite brash soils, never, however, in any case trenching upon cultivation.

Professor Lindley says of them, "The species are found in barren fields in Europe, Asia, and North America, and in sterile places in countries of the southern hemisphere beyond the tropics. A single species is described from Peru.

"*They are all uninteresting weeds, of no known use.*"

This paragraph, which we have marked in italics, would lead us to the author's conclusion that they contained neither garden flowers nor physic herbs, but for ourselves we think their uses are highly important if they are in themselves curious in form or of interest for any known propensity. Those, then, who observe plants narrowly may often find their best uses in explaining to them the nature of the soil which the very presence of some plants indicate with the precision of a chemical analysis.

CASES OF SUPPOSED POISONING OF CALVES FROM EATING YEW.

By D. H. Tombs, M.R.C.V.S., Burford, Oxon.

In June last several yearling calves, the property of Mr. J. Wakefield, of Sherborne Park Farm, Gloucestershire, were placed in a park pasture for a day; when brought into the yard the next morning they seemed quite well, with the exception of having a number of sores, varying in size from a threepenny piece to a florin, on the inside of the hind legs. These sores appeared at first like ulcerations of the epidermis; they presented a raw surface, which, however, soon became crusted over with a scab. They healed very rapidly, the epidermis crumbling away like powder.

In an hour or two afterwards one of the calves lay down, and on trying to rise again it was unable to do so. It exhibited symptoms of paralysis and was in a state of coma; the brain evidently being affected. It soon died. Another calf was seized in a similar manner, and died about three hours after it was attacked.

I did not see either of these calves until they were dead,

but on being summoned I found two others very dull, and having scabs on the inside of the hind legs, as before mentioned; the remainder (four) had no eruptions, and exhibited no symptoms of disease. These six were at once drenched with eight ounces of sulphate of magnesia combined with an ounce of ginger, and afterwards a diffusible stimulant was administered.

The next morning the purgative medicine had operated freely.

The calves were kept in a yard afterwards and went on well. One more, however, had some eruptions, but slighter than those of the first four.

I made an examination of the calf which had died first, but when I saw it the head had been carried away. The abdomen, when opened, was found to contain a quantity of exuded serum mingled with blood. The heart, lungs, liver, and spleen, were healthy. The rumen had patches of extravasated blood between its coats in different parts, which were scattered and not very large. Its coats were in places separated from each other; the villous coat readily came off in large pieces when touched, and separated portions were mixed up with the ingesta contained in the stomach, being, in fact, completely wrapped up in it. The reticulum, with the exception of a similar extravasated patch or two, was healthy. In the omasum the food was dried up more or less throughout; in some places it was quite dry and friable, particularly near the attached edges of the leaves of the stomach. The villous coat had peeled off some of the leaves and become fixed to the ingesta, and on nearly all the leaves were isolated patches of inflammation, which, as a rule, presented the appearance of rays emanating from a central point. On the external surface this stomach showed extravasation in places. The abomasum was inflamed in places, as were some of the small intestines, which also had a few scattered extravasations; this stomach contained a large piece of hard ingesta, which, when broken up, was found to be composed of cake and meal mixed together, and so dry as to readily break in pieces. The right kidney was congested, and so were the parts around it. On the muscles of the right shoulder was a patch of extravasation, another on the right side of the neck, one on the left quarter, and one on the hock. After a careful search I could find no traces of any noxious plant or substance in the contents of any of the stomachs or bowels.

On opening the abdomen of the second dead calf a quantity of serous fluid, slightly tinged with blood, escaped, but not so much as from the first calf when that was opened. There

was also a small quantity of viscid serous effusion in the chest, and more than a normal quantity of fluid, also viscid, in the pericardial sac; the lungs and heart were healthy. The rumen was partly distended with gas, but, with the exception of slight congestion in places (which was the case here and there throughout the stomachs and intestines), it was healthy, as were the reticulum and omasum, the ingesta in the latter stomach being moist and normal. The abomasum and some portion of the small intestines were inflamed in parts, but not to a great extent. The liver was healthy; the gall-bladder was distended with bright yellow bile. The kidneys and bladder were healthy. I carefully examined the contents of the stomachs and intestines, but could not find anything of a poisonous nature. When the bones of the cranium were opened it seemed as though a black mass had taken the place of the brain; it was quite black nearly throughout its structure; the membranes of the brain were black with congestion, and so was every vascular part in the cranial cavity, but this change of colour did not extend down the spinal cord. I have never seen a brain in anything like such a state. It was unfortunate that the head of the other calf was taken away.

In the pasture where the calves were turned out were some yew trees, and the young leaves at the time were sprouting out. On examining these trees it was very apparent that the leaves and a few sprigs had been recently cropped off in places by some animals. Cart horses were turned out in the same place with the calves, but they showed no signs of ill health. A few years since several horses were very ill after eating some of the leaves from these same trees; they recovered, however, the purgative medicine given causing twigs of yew to be expelled in the fæces. The branches of the trees were at that time cut away, and have now been again. No poisonous plants could be discovered in the pasture, nor anything noxious except the yew.

Considering the suddenness of the attack, its rapid and fatal termination in the two cases, I formed the opinion that the calves were poisoned, and, as I have before stated, no poisonous plants or traces of anything noxious could be discovered in the pasture except the yew, I considered it to be the cause of the mischief. In the case of the horses, before referred to, twigs of yew were expelled in their fæces; and to account for there being no such twigs found in the stomachs or intestines of the calves, I inferred from the appearances of the trees that they had eaten young leaves, which had become assimilated with the ingesta, and all visible traces were thus lost; that the poisonous properties had been absorbed, and,

although acting on the circulatory system, had more especially affected the brain, causing coma and death.

As the cases are interesting I send them to you for insertion in the *Veterinarian*.

Pathological Contributions.

THE CONTAGIOUS DISEASES (ANIMALS) ACT, 1869.

"RETURN of the Number of Foreign Animals brought by Sea to Ports in Great Britain, which on inspection on landing, within the Month of October, 1874, have been found to be affected with any Contagious or Infectious Disease, specifying the Disease, and the Ports from which, and to which, such Animals were brought, and the mode in which such Animals have been disposed of.

Foreign Ports from which brought.	Ports in Great Britain to which brought.	Disease.	Number of Animals affected.					Disposal.
			Cattle.	Sheep.	Goats.	Swine.	Total.	Slaughtered at place of landing.
Rotterdam	Hull .	Foot-and-Mouth .	...	4	...	...	4	4
Total			...	4	...	...	4	4

"ALEXANDER WILLIAMS, *Secretary.*

"Privy Council Office,
"Veterinary Department, 12th November, 1874."

CATTLE PLAGUE.

CATTLE PLAGUE is reported to prevail in eleven districts in Poland; it also exists in Croatia, Slavonia, the military frontier, Buckowina, Galicia, Carniola, Lower Australia, and Dalmatia. The disease does not however appear to have spread in Hungary. Cattle plague is reported to have ceased in Salonica, but it has broken out in two villages near to the city, in Macedonia.

PLEURO-PNEUMONIA.

We learn that pleuro-pneumonia has appeared in another department in Switzerland, viz., the Canton du Valois. A veterinary surgeon has been despatched by the Government to inquire into the outbreak and report thereon as a result of the inquiry. Seven farms have been declared infected. Fifty-four cattle have been destroyed; twenty-one of them while suffering from the disease.

Another outbreak of pleuro-pneumonia has occurred in Holstein on a farm in the village of Wansbeck, five miles east of Hamburg. The farm has been isolated and the movement of animals prohibited except after inspection; if found diseased they are to be slaughtered, and the owners recompensed by the state.

In reference to the outbreak of pleuro-pneumonia at Ditmarschen in Holstein, to which we referred last month, it is reported that rigorous measures have been taken to stamp out the disease, the movement of the whole of the cattle in the infected district being stopped. Eleven diseased animals are stated to have been slaughtered.

In the Netherlands there has been an increase in the number of cases during the last month, notwithstanding "that everything had been done to arrest the progress of the disease. Inspection is rigidly carried into effect, even of unsuspected herds, by properly qualified persons, and the inoculation of all suspected cattle" is practised.

Under the *nom de plume* of "Observer," a correspondent writes to us from Limerick, that in last month's *Veterinarian* Mr. Read, M.P., is reported to have stated that very little pleuro-pneumonia exists at the present time in Ireland. Our correspondent says that "it is true that but few farms are under restrictions just now, but a glance at the butchers' shambles reveals to passers by that many animals, the subjects of the disease, find their way to the slaughterhouses which are not reported to the Privy Council.

"On Saturday last I perceived the most glaring case I have met with for some time past. A side of beef was hung up in a shop of a most respectable purveyor of meat, which indicated that at one portion of the chest, the size of a man's hat, an adhesion of the lung had existed. I could point to many similar cases in this town. Every day, nearly, diseased meat is seen hanging up in the shops. The fact of no noise being *now* made as to the existence of pleuro-pneumonia in

certain localities enables the traders of stock to send diseased animals into the town with the greatest ease."

"The evidence given before the Select Committee, by a gentleman residing in this country, as to the fact of a large quantity of meat being at all times furnished to the troops in garrison, was perfectly in accordance with my *every day observation.*

"If any person declares that 'the disease' is nowhere to be found in this neighbourhood, it only goes to prove he is ignorant of facts."

FOOT-AND-MOUTH DISEASE.

This disease, which appears to have reached its minimum in this country, has broken out in a virulent form in Germany. Large numbers of animals have arrived lately at the ports from that country affected with the disease.

CATTLE DISEASE IN SOUTH AMERICA.

A virulent disease (the nature of which is not stated) is reported to have broken out among sheep and cattle in the province of Uruguay in South America. The losses are stated to be at the rate of 40 per cent.

Facts and Observations.

Trichinosis in Germany.—The *Magdeburg Gazette* announces that in the town of Linden up to the end of last week 56 persons—35 men and 21 women—had died of *trichinosis.* None of the victims were more than thirty-two years of age. The *Gazette* protests against "the neglect of the sanitary service which might have saved 56 persons from a death the occurrence of which is easily rendered impossible by a proper inspection of the food sold to the public. From the large amount of attention now paid to the subject of parasites and parasitic diseases at the English veterinary college, it is clear that this duty of inspection ought to be performed by skilled members of the profession."

Decomposition of Leaves by Carbonic Acid.—The phenomena of decomposition of carbonic acid by leaves under the influence of light is well known. The inverse phenomenon, that, viz., of absorption of oxygen, and emission

of CO_2 in the dark, has attracted much less attention. MM. Deherain and Moisson have just communicated to the Paris Academy an interesting memoir on the subject. They find from experiment that the quantity of CO_2 emitted by leaves is comparable to that furnished by cold-blooded animals; frogs give, in respiration, a quantity of the gas much below that from leaves of tobacco, or mustard, or sorrel. The quantity that leaves emit increases with rise of temperature, and at 15 deg. (it is stated) the respiratory activity of silkworms is comparable to that of decayed leaves observed at 30 deg., but considerably higher than what these manifest at 15 to 20 deg. C. Leaves kept in the dark, moreover, absorb more oxygen than they emit CO_2; and they continue to emit CO_2 in an atmosphere deprived of oxygen. When carbon burns and gives CO_2 a certain quantity of heat is brought into play, and that heat is utilised, according to MM. Deherain and Moisson, for the formation of vegetal matter necessary to the growth of the plant.—*English Mechanic.*

Butyric Fermentation. By Victor Paschutin ('Pflüger's Archiv. f. Physiologie,' viii, 352—381).—After making an extended series of experiments under varied conditions, Paschutin concludes that there is no analogy between the butyric ferment and the so-called soluble or unorganised ferments. Thus, whilst the salivary fermentation proceeds with normal intensity in concentrated saccharine solutions, and the three pancreatic ferments act energetically in concentrated saline solutions and in glycerin; butyric fermentation never occurs under these conditions. Pancreatic fermentation goes on undiminished even in strong solutions of potassium arsenate or chlorate, whilst the butyric fermentation is effectually put an end to by the addition of minute quantities of those salts. Alcohol and ether are used for the preparation of soluble ferments in a state of purity, but destroy the butyric ferment. This must be considered to be a ferment analogous to organised ferments, as *e. g.*, beer yeast.

Numerous analyses of the gases evolved during butyric fermentation are given.—*Journal of the Chemical Society.*

The Carrier-Pigeon.—The travelling pigeon never feeds. If the distance be long it flies on without ever stopping to take nutriment, and at last arrives thin, exhausted, almost dying. If corn be presented to it, it refuses, contenting itself with drinking a little water and then sleeping. Two hours later it begins to eat with great moderation, and sleeps again immediately afterwards. If its flight has been

very prolonged, the pigeon will proceed in this manner for forty-eight hours before recovering its normal mode of feeding. Is this not an admirable proof of instinct?—*Medical Times and Gazette.*

Treatment of Traumatic Tetanus by Chloral.—Dr. Coryllos (*Allgemeine Wiener Mediz. Zeitung*, 27th Jan.) reports two cases successfully treated after removal of a foreign body from the wounds. Chloral, to the extent of from a drachm and a half to two drachms daily, had been administered. In one case, $3\frac{1}{2}$ ounces had been given in the course of twenty days; and in the other case, which extended over a longer period, 6 ounces of chloral in all had been given. M. Chauvel also records two cases, *Progrès Méd.*, 2nd May. He gave the chloral in doses averaging 37 grammes in twenty-four hours. In neither case were the symptoms relieved, and both patients died. M. Verneuil was more successful in the treatment of two cases, details of which were communicated by htm to the *Société de Chirurgie de Paris.* He gave a drachm and a half of chloral in the twenty-four hours in one case, and two drachms and a half in the other. Both cases were cured. Although M. Verneuil does not condemn M. Oré's plan of intravenous injection of chloral, he would not begin the treatment of a case of tetanus in this way; he has now cured five cases of tetanus by chloral administered by the mouth.

Dr. A. Von Huttenbrenner *Jahrbuch für Kinderheilkunde*, vol. vii) thinks that chloral is preferable to all other remedies in the treatment of trismus neonatorum. He gives it in one or two grain doses, dissolved in the mother's breast-milk, and carefully poured through the child's nose. He repeats the dose with each paroxysm until the child passes into a calm sleep.—*Edinburgh Medical Journal.*

Atropine hypodermically used in Traumatic Tetanus.—Dr. Miller records a successful case, *Phil. Med. and Surg. Reporter*, 21st March. Hydrate of chloral was administered, and $\frac{1}{60}$th gr. of sulphate of atropia was given hypodermically twice daily for four weeks. The pulse-rate was from 112 to 120.—*Ibid.*

Parenchymatous Injections of Carbolic Acid.—Hüter has employed this method of treatment with success in arthritis of the knee, in subacute adenitis, and in traumatic erysipelas, &c. He asserts that it immediately relieves the pain, and quells the local fever.—*Centralblatt*, 24th Jan.

THE VETERINARIAN, DECEMBER 1, 1874.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

THE CONTAGIOUS NATURE OF PLEURO-PNEUMONIA.

OUR remarks on the subject of the spread of pleuro-pneumonia have been, so far as we can learn, universally interpreted by the agricultural press in a manner as startling to ourselves as unsatisfactory to our critics. We are suddenly called upon to accept the position of defenders of a new view of the nature of the disease; pleuro-pneumonia, we are informed, is in our opinion a non-contagious disease.

The following paragraph from the *Yorkshire Post*, which is merely a reiteration of the statements which have been made by other journals, puts the conclusion in a sufficiently definite form.

"Considered by all graziers who have had practical experience of its effects, and have witnessed its birth and diffusion through a herd of cattle, and traced its progress from farm to farm, to be a disease in the highest degree contagious, treated as such by Act of Parliament—as "Contagious Diseases Animals Act"—pleuro-pneumonia is now declared non-contagious by our highest veterinary authority.

"In an article in the last number of the *Veterinarian*, Professor Simonds gives the details of certain experiments made some time ago and of some made recently, showing the failure of attempts made to propagate pleuro-pneumonia by contagion, and also by injecting serous exudations from the lungs of a cow affected with pleuro-pneumonia into the left lung of a calf. Upon which he remarks—'It is thus conclusively proved that pleuro-pneumonia does not extend the area of its existence by any of the ordinary means which cause the spread of infectious disease." The plain meaning of this is, that the disease does not spread by contagion."

Whatever the plain meaning of the last passage may be, it is clearly not the meaning which we intended to convey; we say advisedly clearly not, because in the opening sentence of

the article we say, "Pleuro-pneumonia has been supposed to be easily communicated by diseased to healthy animals through various means other than that of actual cohabitation." The plain meaning of this surely is, that pleuro-pneumonia can be communicated from diseased to healthy animals by actual cohabitation, and it is equally plain that a disease so communicable is a contagious affection. Writing, as we do, chiefly for professional readers, it is difficult to avoid using sentences which may not be altogether explanatory of every phase of the subject under discussion; but we cannot admit that we left the fact of the communicability of pleuro-pneumonia through the means of cohabitation at all doubtful. The simple conclusion from our experiments is, that pleuro-pneumonia is not transmitted in any other way.

That the disease is not produced by inoculation has been proved to demonstration in thousands of cases. On the other hand, that it is a highly contagious disease, easily propagated by association of diseased with healthy animals, no one who knows anything of cattle entertains the slightest doubt. We therefore quite sympathise with the writer of the article from which we have already quoted, when he says—

"Practical observers," says an authority who has acquired his knowledge by lengthened experience, "have in hundreds of cases traced the infection of sound and healthy cattle to their coming in contact with one affected animal. In one season we lost forty-eight head of feeding cattle out of one pasture, into which six animals were introduced from a drove of Irish cattle, all of which succumbed to the disease within three weeks after purchase. The other animals which took the disease from the Irish had been on the farm three months, and more than half of them had been wintered in straw yards."

Admitting the truth of these statements in every particular, we repeat, that our experiments justify the conclusion that pleuro-pneumonia is not propagated according to the ordinary means by which contagious diseases extend their area, that is to say, through the medium of morbid products of the disease. So far as demonstration reaches, contact with a living diseased animal is necessary to the production of the malady;

and this statement, be it observed, applies to no other contagious disease to which animals are liable.

PARASITISM IN AMERICA.

From the recently published Report of the Massachusetts State Board of Agriculture we are glad to perceive that much attention is being paid to the subject of entozoa. At the Annual Meeting of the Board in February it was announced that Mr. Noah Cressy had been elected Professor of Veterinary Science at the Agricultural College. This gentleman, during the delivery of an able discourse, entitled "The Demands of Agriculture on Veterinary Science, and the means of its accomplishment," took occasion to remark that the American veterinary manuals were "far behind the age of scientific advancement, especially in relation to the origin of certain parasites." In this connection he especially pointed to the labours of Dr. Cobbold at the Royal Veterinary College in England, who he said had "done more to awaken an interest concerning the numerous complaints both in a medical and sanitary point of view than any other professional man at home or abroad" (p. 336). Speaking of Dr. Cobbold's 'Manual of the Parasites of Animals,' Professor Cressy says:—"We shall adopt this as a text-book, and shall require an examination in the same at the close of the senior year." In the second and third annual reports on the diseases of the domestic animals in Connecticut (1873-74), Professor Cressy also devotes a considerable space to the subject of parasites, and more particularly to the "verminous bronchitis" affecting sheep.

Extracts from British and Foreign Journals.

THE PRESENT TREATMENT OF BITES BY DOGS, AS BEING UNSOUND IN THEORY, INJURIOUS AND UNSUCCESSFUL IN PRACTICE.

By John Haddon, M.A., M.D.

Hydrophobia has been of very frequent occurrence of late years, more especially in Lancashire. Those who have witnessed the symptoms which go to form hydrophobia cannot soon forget them, and all who have had experience of its treatment agree that, as yet, treatment is hopeless. Under such circumstances, when medicine in the most skilful hands is of no avail, when the first onset of hydrophobic symptoms is like the death-knell of the unfortunate individual, it seems to me that preventive treatment cannot be too carefully studied or too urgently insisted upon.

The first difficulty met with in the treatment of a bite, is to know whether the dog was mad, or whether there is any danger of the bite having in it the poison we dread. This is a very great difficulty, since cases are on record where hydrophobia has followed bites inflicted by animals which were not supposed to be in the rabid state, because the symptoms of rabies in the dog are not sufficiently well and generally known to make a diagnosis easy.

Dr. Burdon-Sanderson has lately addressed a letter to the *Times*, detailing the symptoms of rabies in the dog according to veterinary teaching.

Now, on looking carefully at the premonitory indications mentioned, the only one which appears at all peculiar to hydrophobia is that the dog bites indiscriminately. That appears to me the only symptom on which we can rely in diagnosis prior to the development of the last stage of the disease. A dog's demeanour may change from any indisposition. It is not uncommon for dogs to eat all kinds of filth; but to find a dog biting indiscriminately is rare, and would seem to be peculiar to, and an early symptom in, rabies.

The present treatment of bites by dogs is the free application of the nitrate of silver to the injured parts; and, seeing that hydrophobia may be caused by bites of dogs not supposed to be mad, this treatment is generally applied to all bites. In the *British Medical Journal* for May 23, 1874,

I find the following paragraph:—"In a very able clinical lecture delivered some time since at St. George's Hospital, but recently reprinted in his collected works for private circulation, Mr. Cæsar Hawkins mentions that the late Mr. Youatt told him that a great many persons consulted him after they had been bitten by dogs, and that he always used lunar caustic, which he applied to himself and his servant every time, and in round numbers to perhaps 400 others, and that out of this number one had died of fright, but none of hydrophobia. The early and complete application of caustic to the part bitten is the one only means which can be relied on."

That is the opinion of Mr. Youatt, as delivered to Mr. Cæsar Hawkins, accepted and repeated by Mr. Hawkins, and propagated by the *British Medical Journal* as correct. What I shall endeavour to prove is, what I believe—viz., that the treatment of bites by dogs with lunar caustic is unsound in theory, injurious, and unsuccessful in practice. There are few methods of treatment which have not some one who is regarded as an authority for their originator. We can trace the reputation of mercury as a cholagogue to that prince of irregular practitioners, Paracelsus. On the same principle we find ipecacuanha in mixtures when any cough has to be combated.

And so, because Mr. Youatt said that lunar caustic was the proper thing to apply to the bites of dogs, lunar caustic has been applied most unsparingly by practitioners, regular as well as irregular; and this method of treatment has become so general that to depart from it is somewhat difficult.

The treatment is founded on a theory which we gather from the following extract written by Mr. Youatt, the veterinary surgeon:—"The eschar formed by the nitrate of silver is hard, dry, and insoluble. If the whole of the wound has been exposed to its action, an insoluble compound of animal fibre and the metallic salt is produced, in which the virus is wrapped up and from which it cannot be separated. In a short time the dead matter sloughs off, and the virus is thrown off with it."

That is the theory on which the treatment by lunar caustic is based. It presupposes that the virus is lying in the wound; it assumes that the compound formed on the application of the salt contains the poison, that it is then in an insoluble state, and so innocuous; and lastly, that when this compound separates it takes all the poison with it. I am not aware that any proof has been offered of the truth of these assumptions. Allowing that the whole or a part of the virus remains in the

wound when the nitrate of silver is applied, it forms a substance which is certainly dry, but we have no evidence to show that the virus is in it in an insoluble form and rendered innocuous. On the other hand, it is possible that we may shut in some of the virus at the back of this dry layer, and so give it the best possible opportunity of being absorbed, and of producing the very evil we ought to guard against. Such being the facts, I think I am entitled to say it is an unsound theory.

That it is injurious in practice, I appeal to the experience of all who have used it. I have seen wounds caused by dogs while in a temper or in fun, which were small, and would have healed up quickly, made into very troublesome sores, without, I believe, any gain to the patient. Should such a wound happen to be in a joint, and the nitrate of silver used, the cure would certainly be worse than the disease; and were it only to save such cases from unnecessary suffering, I think the present treatment of bites by dogs ought to be reconsidered.

That the treatment by lunar caustic is unsuccessful in practice, I have only to point to results. I might cite cases without end where the freest application had been made within a few minutes after the bite, in which hydrophobia occurred in due course, and soon terminated in death. And I would ask—Can a remedy which has been of universal application for at least a generation in this particular class of cases, be trustworthy when, in spite of its use, hydrophobia not only continues to exist, but increases rapidly, and is at present causing quite a panic amongst the public? Surely a quarter of a century is sufficient to have used lunar caustic and found it of no avail.

But while we would endeavour to shake the general faith in this practice, we must also attempt to substitute some other treatment, if possible, on sounder principles. With this view we may take a short survey of the subject. Rabies is admitted to be a contagious disease, propagated by the bite of the rabid dog, or the contact of its saliva with a raw surface. In the case of a bite, if let alone it heals like any other wound. Of persons bitten by rapid dogs it is computed that about 4 per cent. have hydrophobia, which shows itself in a varying time, but generally about six weeks after the bite. There is thus a long incubation period, and death generally takes place on the third day from the commencement of hydrophobic symptoms.

There is at present no means known by which the disease can be cured. Death is inevitable when the disease is once

developed; and so in the meantime our efforts must be directed to the preventive treatment.

What, then, can be done to prevent the disease? Reasoning from analogy, and with the accumulated experience regarding epidemics of smallpox and such-like infectious diseases, we are at once directed to the stamping-out process. It will be admitted by those best qualified to judge, that, were we able to enforce and carry out perfect isolation with regard to smallpox, the disease might never destroy and disfigure our population, as it regularly does. If so, the same measures might much more certainly render hydrophobia a disease of the past. Rabies and smallpox have many points alike as regards their propagation. Both are the result of infection. The infected individual can convey it to another—in the case of smallpox, probably by the exhalations and excretions of the body; in that of rabies, only by the saliva touching a raw surface. Thus, of the two diseases, smallpox is the more subtle and more easily spread; and thus rabies ought to be so much the more under our command. The period of incubation of rabies in the dog being known, Parliament might determine that all dogs in this island should be confined separately beyond that period, and that imported dogs should undergo a regular quarantine. In that way, if, as is generally believed, rabies is propagated by contagion alone, there would be an end to hydrophobia. That seems to me what may be termed the radical treatment, and the only rational means of rendering bites by dogs less dangerous, and of depriving them of the dread with which at present they are deservedly associated. A proposal has been made to file down the large teeth, so as to make them blunt. In this way it is asserted the dog is rendered harmless, being unable to break the skin. I very much doubt this statement; but, were it true, the saliva still has the poison, and the animal is a source of infection and dread; besides, there is little chance of this suggestion being universally acted upon.

If measures are not adopted to stamp out rabies in the dog, then we must endeavour to find a means of treating the bite in such a way as to render it, if possible, harmless. When we consider this subject, difficulties assail us which seem well-nigh insurmountable, and make us doubtful of ever attaining the desired end. When we reflect on the rapidity with which substances are absorbed, and travel the whole round of the circulation, we are inclined to question the efficacy of any treatment after the bite is made. It is, however, possible that the peculiar poison of rabies may have a slow rate of absorption, and so give us some chance of

removing it from the wound, or rendering it by some means innocuous. Hippocrates of old, in his wisdom, which we all admire, said that the physician must "have two special objects in view with regard to diseases—namely, to do good or to do no harm." That is a maxim the ventilation of which might be of eminent service, even in this enlightened age, in general practice, and it is particularly appropriate when we come to consider what must be done with the bite of a mad dog.

Tetanus is a disease which, in its symptoms, has a peculiar resemblance to hydrophobia. Spasms occur in each on the slightest irritation of any of the organs of sense; both are peculiarly diseases of the nervous system; and in neither on *post-mortem* examinations is there anything very definite to account for death. Tetanus we know to be caused by a wound, more especially by a wound which does not heal quickly. Hydrophobia is not supposed to be caused by the wound, but by the saliva, in which some virus exists. Nevertheless, it would seem right that we should not follow any treatment which can retard the healing process.

The principal indications, then, for the treatment of a bite are:—

1. As soon as possible to remove the virus from the wound or render it innocuous.

2. To get the part healed as speedily as possible.

With regard to the first indication, so soon as the bite is inflicted it is not likely that a surgeon can be at hand, and so it would be well for the patient to suck the parts vigorously, if they are within reach. That will encourage bleeding, and tend to remove any saliva that may be in the parts. A ligature between the wound and the heart might also be applied to encourage bleeding. When the surgeon is consulted I would advise, when the dog is known to be rabid, excision of the bitten parts where practicable; afterwards, and where excision cannot be performed, I would wash out or syringe the parts freely with a saturated solution of carbolic acid in very hot water, and get the wound healed as soon as possible.

By that means I think we may hope to remove by excision or destroy by the carbolic acid any virus in the wound, and at the same time expedite the healing process. By such a method of treatment we can do no harm, and, from the well-known properties of carbolic acid, we may hope that it will do some good.—*Medical Times and Gazette.*

THE TRANSMISSIBILITY OF TUBERCULOSIS.

By George Fleming, M.R.C.V.S., Royal Engineers.

One of the most interesting and important, and, indeed, it would appear urgent, questions of recent times, as far as pathology, human and comparative, as well as sanitary science, are concerned, is that of the probable, nay certain, transmission of tuberculosis from mankind to animals, and possibly from these to the human species or to each other. The infectiousness or contagiousness of this morbid state is certainly no recent belief. Morgagni, many years ago, asserted that phthisis was communicable from one person to another, and a few physicians have now and again since then, though somewhat hesitatingly, it is true, expressed their conviction that it was more or less capable of transmission by cohabitation; and, though rarely, stress has been laid upon the great danger of allowing healthy people, especially young children, to associate with those who are consumptive.

Notwithstanding all this, however, tuberculosis has not been generally recognised as contagious in the human species, and, indeed, it has been denied that it possesses this property.

Though the disease is one of the most prevalent and fatal of any affecting mankind, it is far from being uncommon among animals, and especially those kept in confinement, as in menageries and zoological gardens; while among those which are domesticated, it is of somewhat frequent occurrence. Of the latter, the bovine species suffer far more than any other; and it is this fact which invests the question of transmission with such supreme importance, and causes us to look forward with so much anxiety for the solution of the serious problems involved in it. The flesh of the ox is consumed as food, and it is essential that it should be in as healthy a state as possible; though the process of cooking might be relied upon, to some extent, to annul any pernicious properties it might have acquired through the animal having been in a diseased condition during life. Far otherwise is it with the milk derived from the cow. This seldom undergoes any process which would be likely to destroy whatever injurious qualities it might chance to be endowed with through the unsanitary state of the animal which yields it; and when we reflect that milk enters largely into the diet of young people—is, indeed, the chief aliment of children and infants, whose bodies it builds up—the question of acquiring disease in this way, and especially such a malady as tuberculosis, becomes one of the gravest moment.

It has just been stated that the bovine species is far more extensively affected than the other domesticated animals; indeed,

there appears to be a strong predisposition to tuberculosis in cattle, though from an absence of all statistics with regard to diseases among animals, we cannot arrive at anything like an approximate notion of the percentage affected with phthisis. There is no supervision of the slaughter-houses with regard to the state of the animals killed therein; and in private establishments, such as are now tolerated everywhere, such a desirable measure could scarcely be carried out in a satisfactory manner; so that we cannot hope to ascertain the extent to which the malady prevails, and must content ourselves with the fact derived from professional experience that a very large proportion of the cows which have been kept for any length of time in badly constructed sheds, and milked freely, are more or less diseased. For France, Cruzel says that in a hundred old oxen, fattened and slaughtered for food, at least one half will have the lungs more or less tuberculous; and in a hundred cows, those which are not are so affected in very small proportion. In many instances the amount of tubercular matter deposited in and around various organs is something astonishing: the heart and lungs of the cow in some cases weighing seventy, eighty, and even ninety pounds. The masses of tubercle may be deposited on the membrane lining the chest, and may vary in size from that of a mustard seed to that of a hazel nut; the lungs may also be more or less involved, as well as the spleen, liver, mesenteric glands, kidneys, superficial glands, peritoneum, and intestines. Sometimes immense irregular masses are found extending beneath the spine, from the anterior opening of the chest as far as the kidneys, often attaining their largest dimensions at the root of the lungs. At times, though rarely, tubercular deposits are met with in the muscles and other parts not specified above. Of course the butcher, who is well acquainted with the anatomical characters of the disease, takes good care to remove every trace of these suspicious-looking masses from the carcase of the animal in the process of dressing it for the stall; so that unless the inspector is more than usually alert and well qualified for his duty, such a carcase may easily escape detection. And even if the presence of tubercle be discovered, I am not aware that any suspicion of danger exists as to the utilisation of the flesh, or even of the tubercular matter, as food. It is a notorious fact that the milk of phthisical cattle is regularly sold for food, and that these creatures, even in the most extreme state of disease (in Scotland they are known to the butchers as "piners") are sent to the slaughter-house, whence their flesh is carried to the butcher's stall, to be disposed of to the poorer classes.

For many years the identity of this bovine disease with human phthisis was denied, and, indeed, a very recent observer, Professor

Reynal, of the Alfort Veterinary School, yet maintains that the bovine and human tuberculosis are essentially different in their histological features. Describing the elements entering into the composition of the bovine tubercle, and pointing out that there are no blood-vessels in its texture, this authority says, "The complete absence of nutritive vessels in the proper tissue of the tubercles explains why these, being nourished exclusively at their periphery, must necessarily only acquire a very small size before the central necrobiosis begins: a special peculiarity which distinguishes them from the sarcomatous tumours with which Virchow has unrestrictedly assimilated them. Also, notwithstanding the respect we entertain for the opinions of the learned histologist, we cannot altogether accept his notions of the subject. The elements of the bovine tubercle are identical with those of sarcomatous tumours: this is incontestable; but the absence of nutritive vessels in the first, and, from this circumstance, the determinate volume which they can never exceed, are two sufficient reasons, in our opinion, for separating it from the latter. Thus, for us, this new formation is neither the same as human tuberculosis, as the majority of writers would have it; neither is it a kind of sarcoma, as is affirmed on the other side of the Rhine. It is a typical lesion, having its own proper form and individuality, belonging exclusively to an animal species, and incapable of being transferred to another, notwithstanding what has been affirmed to the contrary."*

It must be observed, however, that Schüppel,† Professor of Pathological Anatomy and General Pathology at the University of Tübingen, who has made an almost exhaustive study of tubercle in general, and particularly that of the bovine species (tuberculosis in cattle being known in Germany as the "Pearl-disease" —*Perlsucht*, from the appearance of the tubercular masses, which are called "grapes" and "angle-berries" in this country), has fully established the absolute identity in structure and development of the cattle disease with tubercle in man. According to this authority, the first visible step in the formation of a tubercle is the presence in the interior of small blood-vessels (diameter of 0·02 to 0·03 millimètre) of peculiar masses of more or less globular form, made up of a congeries of dark granules, held together by a homogeneous connecting substance, and varying in size from 0·01 to 0·03 millimètre, having no nucleus nor limiting membrane, but offering a granular outline. These may occur simply in the blood-column, or two or three near together;

* Reynal, 'Traite de la Police Sanitaire des Animaux Domestiques.' Paris, 1873, p. 701.

† "Ueber die Identität der Tuberculose mit der Perlsucht," Virchow's 'Archiv,' p. 38, 1872.

they are most frequently met with in veins, more rarely in capillaries, and very seldom in arteries. Schüppel regarded them as masses of protoplasm, and proposed to call them, after Kölliker, "non-nucleated protoblasts." The walls of the vessel containing these show no alteration, but when they are large and block the tube, it usually has a fusiform dilatation. The first change noticed in the protoblast is in its most external layer, which loses its granular character and appears as a smooth limiting membrane or line. Nuclei soon show themselves in its substance, and thus it becomes a giant-cell (*Ressenzellen*), the most essential element of a tubercle, and which, when fully developed, may contain from one to eight or ten of these. How the nuclei are formed could not be ascertained, but it was believed that they arise independently of any pre-existing nuclei, like the nucleus of the first cleavage-cell of the ovum after the disappearance of the germinal vesicle. In some giant-cells, however, in addition to the perfectly formed nuclei, faint homogeneous bodies of smaller size are visible, and these were imagined to be an early stage of the former. When once formed the nuclei multiply by division, as may be concluded from their often presenting an hour-glass shape, and containing two nucleoli. The giant-cell now ceases to present its original globular form, becoming irregular in shape, and putting forth branched protoplasmic processes—changes due to its inherent vital contractility. No account could be given as to the condition of the vessel in which the protoblast was originally situated; as by the time the nuclei become developed, the vascular wall ceases to be visible. The epithelioid cells, as well as the reticulum, which is not present in the earliest stages of the tubercle, in all probability derive their origin from the original giant-cell. The protoplasmic processes of the latter often present, at a short distance from the parent-cell, fusiform nucleated dilatations, and by the detachment of these new cells arise. The reticulum is also most probably formed by the processes sent off by the giant-cell; these branch and unite, and surround the first brood of new cells, and so form the meshes in which the other elements of the tubercle lie. The giant-cells appear at last exhausted, as it were, by this constant proliferation, and in older tubercles form shrunken branched bodies with few nuclei. The original protoblast was supposed to arise by free cell-formation: a process the possibility of which, though long strenuously denied, may be considered as probable, according to the researches of recent observers. Schüppel considers the proximate or exciting cause of the formation of primary tubercle in all organs to be a local inflammation, while the remote cause is the scrofulous or tuberculous diathesis, inherent or acquired; and though he admits that the tubercle detritus possesses infective properties, and is

capable of causing the formation of tubercles both in its neighbourhood and, by absorption, in distant organs, he would even here ascribe, in many cases, the eruption of tubercles to a predisposition of the secondarily affected organs, rather than to mechanical conveyance to them of the infective substance; for a mere mechanical distribution by the blood of the tubercle virus is incapable of explaining the apparently capricious manner in which the tubercles become disseminated. Thus, the frequent occurrence of tubercle in the glands situated in the lymphatic territory of tuberculous organs may be rather due to their being already the seat of simple irritative hyperplasia, than the conveyance to them, by the lymphatics, of any specific tubercular virus; as it has been shown that, in the lymphatic glands, tubercles never originate in the lymph-paths, but always in the follicles.*

So much for the identity and histological anatomy of tubercle in man and the ox. With regard to the causes of the malady in the latter, it has long been admitted that it is hereditary, and strong proofs are afforded in support of this. In the human species its transmission in this way has been traced by Lebert in one sixth of the cases investigated by him; but veterinarians have not yet afforded the statistical enumeration necessary to establish the extent to which it is thus due in the lower animals. Temperament and conformation, which are also hereditary, have for many years been considered to bear an important share in the appearance of tuberculosis in cattle: those of a lymphatic nature, with thick skins, flabby tissues, and light unusual colours, being most predisposed. Damp localities and dwellings, sheds badly ventilated and lighted and kept in a foul condition, sudden checks to the cutaneous transpiration (in draught oxen), and the mode of feeding as well as the quality of the food, have all been reported as favouring or actually causing the appearance of the malady in the bovine species. There can be no doubt that excessive and long-continued lactation has a powerful influence in the production of tubercle in cattle; as those which have been kept in dairies for any length of time are nearly always phthisical, and either die, or when sent to the butcher their carcase exhibits tubercles in various organs. Lafosse,† the eminent professor at the Toulouse Veterinary School, in commenting on this fact, states that the majority of the cows employed in agriculture—as they generally are in France, and particularly in Languedoc—as well as those kept for breeding purposes, and which are only required to give milk for six weeks or two months, most frequently reach the end of their career without being so affected. He also remarks that in mountainous districts, where the calves are suckled for

* 'Cayley 'The Medical Record,' 1873, p. 49.

† Lafosse, 'Traité de Pathologie Vétérinaire,' vol. i, p. 432.

five or six months before they are slaughtered, phthisis is more frequent.

It is this tendency of milch cows to become tuberculous which renders the question of transmissibility so serious and worthy of attention by the physician and sanitarian, no less than by the veterinarian, and calls for the closest observation and research.

The transmission of the malady by cohabitation has scarcely been suspected by veterinarians in this country; at least I am not aware that we have any evidence of this in the literature of British veterinary science. Several Continental veterinary surgeons have, however, insisted upon the contagiousness of the disease. Dupont, of Bordeaux, for instance, some twenty years ago, stated his belief that such a mode of extension was possible; and Cruzel, an old and able practitioner at Grenade-sur-Garonne, in his recent excellent work on the diseases of cattle, does not appear to entertain any doubt in this respect. Speaking of the causes of the malady, he writes:

"Much has been stated with regard to the danger animals incur by being kept in low, narrow, and badly ventilated buildings, and this danger is real; it exists, and may be remarked every day. But all has not been said with regard to this matter when treating of tubercular phthisis. If in a cramped low stable, in which several milch cows are lodged, there chances to be one affected with this disease, and if the tubercles are in a state of ulceration and suppurating, so that the air expired from its lungs is very fetid; then this air, inspired immediately by another cow, carries into its healthy lungs the tubercular infection. It is indeed rare that the breath of animals of the bovine species affected with phthisis has not a remarkable odour *sui generis;* and for a long time, and when called upon as an expert to examine cattle suspected of being affected with phthisis, the first indication I have sought for, on which to base an opinion, has been the odour of the expired air. Whenever I perceived a well-marked and characteristic fœtor, I have diagnosed phthisis (*vulgo* 'pommelière' in France) as certainly present. An ox affected with cough, and therefore suspected, was sold, but had to be taken back by the vendor on his being threatened with legal proceedings. It was a fine animal of the Gascony breed, and appeared to be otherwise in excellent health. Its fellow (in draught), of the same breed, and also as well proportioned, lost condition, and its appetite failed, though it never coughed. Fearing that it might die, the owner determined to send them both to market, and get rid of them. He did so, and both were sold. Soon after the new purchaser made verbal but friendly complaints, not with respect to the lean animal, but the finest one, which had the dry, short, and

frequent cough. The dispute was arranged to be settled by arbitration, and I was entrusted with the task of terminating it in an amicable manner. I consequently most carefully examined the ox whose condition was debatable, testing it while at work, by running, and at rest, auscultation being resorted to. From this examination I could not finally decide that the animal was phthisical; but I had several times inhaled the air issuing from its lungs, and from the fetid odour it possessed I was able to assert that there were ulcerated tubercles (*tubercles ulcérés*) in the lungs. Desirous of assuring myself of this fact by a necroscopical inspection, the animal was sent to the butcher; and I found in its lungs, which were healthy nearly throughout, a single group of tubercles about the size of a small nut. These were in different stages of alteration, and there was an ulcer with a callous margin, from which flowed a small quantity of sanies that had a foul smell, quite the same as that which had attracted my attention and that of the assistants during my examination. It is in this way that tuberculosis is communicated by the expired air; and the facts which support this opinion are numerous. Those veterinary surgeons who practise in the country may gather them every day, and I may more particularly call their attention to the following circumstance:—Two working oxen or cows are brought into the same building, and they eat their forage or ration, or whatever it may be, out of the same rack or manger; lying in the same stable, they respire nose to nose. One is perfectly healthy, at least so far as appearances go; so is the other, except that it coughs from time to time, and its breath is fetid. Soon it is perceived that the other animal, which does not cough, and whose expirations are not fetid, if at first it ate with appetite, shows less desire for food out of the usual receptacle, hangs back from it, and neglects it; and to make it approach the rack or manger one is obliged to push it, to excite it with the hand, and even to beat it with a stick. Nevertheless, this animal does not appear to be affected with disease, nor even to be indisposed; and if it refuses to remain on the same spot as its comrade, it is because it is desirous of getting away from its fetid breath. The cowmen can scarcely be deceived; and if by chance there is an opportunity for selling the diseased animal, or if it can be fattened for slaughter, and its companion gets another healthy comrade like itself, then its appetite quickly returns and no further inconvenience is observed. But if, on the contrary, the situation is not altered by the separation of the two animals, phthisis runs its ordinary course in the one affected, and the other, at first becoming emaciated, is finally attacked with the same disease.

"After this, if we do not wish to recognise in such a case the effects of contagion, we may attribute them to cohabitation,

infection, or anything we like; but we cannot hinder the fact from being present, nevertheless, and to see it reproduced very frequently in the circumstances I have just alluded to."

Other French veterinarians have, since the publication of Cruzel's work, more distinctly alluded to the contagiousness of tuberculosis in the bovine species, and furnished facts which can scarcely be disputed.

Viseur,* of Arras, in 1868, endeavoured to explain the persistence of the malady in certain establishments, well kept in every respect, but in which the cattle were slowly decimated, and in which hereditary transmission could not be included as a cause of the mortality, as breeding was not carried on in them.

In some of these places the malady had lingered for years, and had affected animals of all ages; but not until after they had been a certain time in the sheds, and in contact with the *vaches lactières poitrinaires*.

Zundel,† one of the most talented of the Continental veterinarians, has also commented on the frequent persistence of bovine phthisis in Alsace, in stables well kept and carefully ventilated; and this persistency, he is inclined to believe, can only be attributed to contagion. He alludes to certain establishments in the vicinity of Mulhouse, where, notwithstanding the greatest care in purchasing, and good hygiene and regular feeding, the healthiest animals become affected with the disease after dwelling for a certain time in the stables. Most frequently these are the strong and vigorous Swiss cattle, which, in the words of Zundel, "do not pay their tribute to acclimatisation, as certain people appear disposed to believe, but are in these stables under the influence of a contagion that the owners cannot comprehend, and look upon as a fatality to which they must submit." And yet other animals from the same country, and kept in sheds often less attended to, remain healthy for years. "Is not this a proof," he adds, "that acclimatisation goes for nothing in the mortality attending the first, and that it must be attributed to some circumstance inherent in the places where these accidents occur?"

The evidence of M. Grad,‡ veterinary surgeon at Wasselonne, Alsace, is still more significant and decisive, as it not only furnishes us with clinical observations, but also an experimental fact which adds a great value to the others, while it receives additional weight from them. The observations are guaranteed as perfectly authentic, and were collected during a period of twenty-three years' practice as a veterinary surgeon. At the commencement of his professional career, Grad does not appear to have believed in the possibility of tuberculosis being transmissible amongst

* 'Recueil de Méd. Vétérinaire,' 1873, p. 881.

† Ibid., 1874, p. 93. ‡ Op. cit., p. 94.

bovine animals by cohabitation, but the close observance of a series of facts at length confirmed him in the opinion that it was. In order that the circumstances in which the transmission of the disease was most frequently noticed might be understood, this veterinarian describes the arrangement of the cattle-sheds of the farmers; and it would appear that the animals are generally kept in very short stalls, which completely separate the animals from each other, from the rack and manger to one third the width of the shed. This arrangement, while preventing the cattle from injuring each other with their horns, as they cannot reach one another with their heads, also permits their allowance of food to be given separately.

(*To be continued.*)

THE GROUSE DISEASE.

The following brief and sensible article on the difficulties attending the adoption of any rational method of treating this parasitic affection is taken from 'Land and Water' for November 14th:

"Among the varied suggestions how to alleviate, stamp out, or prevent the grouse disease, there seems unanimity of opinion that diseased birds should be killed whenever met with; it has not, however, we believe, been suggested that this radical principle of stamping out should be carried on at that time of year when the birds whether healthy or diseased will be obeying nature's instinct of pairing. Grouse shooting ends early in December; in fact, nine tenths of the grouse killed are brought to bag before October, and in the six months that intervene before their thoughts are turned to nesting, many a wounded or sickly bird from a late hatch becomes comparatively convalescent, and prepares, in the normal condition of things, to perpetuate its race. Theory on the moors turns out in practice more or less moonshine. The actual cause of the grouse disease has been and will be for a long while a mystery. The difficulties of registering observations, the impossibility of keeping grouse in confinement, the climatic difference of various moors, and other minor points, offer almost insuperable obstacles to a thorough research into the cause, effect, and cure of the disease. We must, therefore, be content to accept the observations of eye-witnesses, practical observers of nature in keepers and educated sportsmen, and to compare their deductions, which at best are strongly tainted with prejudice, with the long series of experiments on dead birds made by Dr. Cobbold

and others. He has proved beyond dispute that strongyles can and do exist in appreciable numbers in healthy birds without any apparent distress in them, while at the same time birds under the same conditions are found living in the most emaciated state, and others again dying, their intestines almost one mass of strongyles and the ordinary tapeworm. Several suggestions to alleviate the disease have, no doubt, some weight in certain localities, but we find again the very arguments used to enforce them on one moor actually upset by practical experience on another. Salt in any form is a tonic and a mild vermifuge, grateful alike to man and beast, but still the disease will decimate moors bordering the sea, where the grouse have salt almost washed down their throats daily. Again, no practical highlander will deny the advantages of patches of fresh short heather for young grouse, either after burning or by close cropping with sheep, but here again any theory will often be utterly upset, and the birds on boggy low land on the same moor will escape in good condition, while those on the high drier and better heathered land will all fall victims. No doubt grouse move about very much in search of food and shelter, and this species of local migration must materially affect the accuracy of statistical observation, but a rough-and-ready report from the moor-keepers themselves will present so many conflicting reasons and natural anomalies as to render any system to provide against the disease impossible.

"In the face, then, of the difficulties of alleviation and prevention, we must take our stand on the theory of stamping out—one that, in such maladies as the cattle disease, hydrophobia, and glanders, has by all practical and scientific authorities been at last admitted to be the only remedy. We must stamp out the disease—not that it is contagious or infectious (other than by the extraordinary powers of propagation enjoyed by intestinal worms), like glanders, &c.—but we must stamp out reproduction, in diseased birds, and if our anxious sportsmen would think less of making *the* big bags of the district in August, and more of killing the barren birds, old cocks, and the latest hatchings, they would assist their moors immensely, and by following up and killing wounded birds before looking for fresh ones, they would do those duties of scavenging and purifying on the hills which nature ordained for the birds of prey, but which our keepers have, by trap and gun, to a large extent counteracted. We cannot say that we admire that sombre gentleman, the Royston crow, or his solitary friend, the carrior crow: two or three nests of sea-gulls on an

inland loch become an unmitigated nuisance, as in this case their nature is perverted from fish to game, and the keeper does well to bring things back to their proper course by a judicious ounce of No. 5 shot; but for the kestrel, sparrow, hawk, and merlin, we have a sneaking regard, and object to see them improved off the face of the earth. An underfed sheep dog, or an old cairn fox on a moor, will do far more damage than a flight of hawks.

"It is not an unwise duty for the moor keeper to patrol his ground at this time of year, and pick off the weak and sickly ones. He may only come across a few, but still those few are to the good. Late hatchings perpetuate late hatchings, so that if any birds are spared it should be the full-grown early ones. When birds pack at the end of the season, to discriminate between the late and early hatchings is, of course, impossible; but on most grounds a good keeper soon knows where the late broods should be, and by careful attention to these few points we have stated above we feel sure much less would be heard of the grouse disease."

Analysis of Continental Journals.

By G. Fleming, M.R.C.V.S., Royal Engineers.

PROTECTIVE INOCULATON FOR BOVINE CONTAGIOUS PLEURO-PNEUMONIA.

In the *Recueil* for July of the present year, M. Boulay, of Avesnes (Nord), contributes an article on "Inoculation for Pleuro-pneumonia;" including the results of a series of inoculations, which, from the success attending his efforts in this direction, he thinks worthy of notice, and more especially as he was at one time inclined to be sceptical of the value of this measure.

These results are in harmony with those observed in every part of the world where this protective measure has been extensively tried for a sufficiently long period, and only further illustrate what has for many years been gradually becoming more and more evident, not only on the Continent, but in South Africa, Australia, New Zealand, and America, where, though the operation has often—indeed almost generally—been performed in the most unscientific and improper manner, its advantages in ensuring cattle from an attack of

the disease have apparently been of the most convincing character. What is more to be remarked upon here, however, is the almost wonderful immunity from those accidents which sometimes immediately follow the inoculations, and slightly detract from their value. And this immunity not only attended Boulay's inoculation, but those of his colleagues in the same part of France. In 728 inoculations there was not a death! Of course, it would be rash to assert that the same immunity must always attend the operation; but Boulay evidently thinks that by his method of inoculating the loss will always remain at a low per centage. This loss has been sometimes high; for in the early days of inoculation, when septic matter was as frequently employed as fresh serum, and when the operation consisted in making ugly gashes at the dewlap or root of the tail, the mortality was often as great as eleven per cent. In recent years, however, it has gradually diminished, until less than one per cent. has been reached.

Boulay thus describes his method of inoculating. Those portions of a diseased lung showing red hepatization are squeezed between the hands, the quantity of fluid obtained being always more than is actually required for the inoculation. The fluid is received in a saucer or bowl, and allowed to stand a few minutes, in order to allow the solid particles to subside. This fluid—the virulent matter, as Boulay terms it—must on no account have undergone the slightest alteration. To inoculate, the ox or cow is held by the head, and the hair is cut closely off the end of the tail, but on one side —usually the right; then the skin is incised with a bistoury to a length of one or two centimetres. With a tea-spoon a quantity of the virus is lifted from the top of the fluid (to avoid the solid portion), and this is poured into the wound at the extremity of the tail: this organ being held in a horizontal position for a minute or two by an assistant, to give time for the absorption of the serum. Then the other animals are inoculated in the same manner.

Boulay thinks the advantages of this mode of inoculation mainly consist in conveying the virus from a saucer or bowl to the wound, instead of directly from diseased tissues, whereby the risk of introducing portions of the lung is avoided; and a mixture of all the liquids contained in the affected organ is also obtained, for he believes none of these should be excluded, as all have not the power to transmit the disease. In obtaining it directly from the diseased lung with a lancet, it may happen that the fluid will be quite inert. It is also necessary to avoid charging the lancet with any solid matter, as Boulay thinks this plays an extensive

part in the production of accidents; because through its not being absorbed in the wound, owing to its volume, it putrefies, and thus poisons not only the organ into which it is introduced, but even the animal.

By making a large incision with the bistoury, absorption of the virus is more certain; and when the assistant allows the tail to drop, only a portion of the fluid has been absorbed —the remainder falls on the ground, carrying with it any solid matter it may contain.

In Belgium, Boulay remarks, the local inflammation which sometimes ensues at the extremity of the tail no longer results in death, as before times; indeed, with certain veterinary surgeons a fatal termination is no longer to be apprehended in any case. In order to avert such a consequence, they merely recommend that the inoculated part be examined several times a day, and if an unhealthy swelling is noticed, or if the tumefaction is greater than usual, to amputate the tail above the part; this is always effective. But when, through the negligence of the attendants, this inflammation acquires excessive dimensions, deep longitudinal incision are made, which are cauterised with an iron at a white heat.

In many of these cases, the end of the tail falls off without attracting anybody's attention. Boulay had four accidents of this kind, and there was no sign by which such an accident could have been predicted. The animals fed well, fattened, and there was not the slightest swelling of the tail. The accident appeared to be due to a kind of dry gangrene. Boulay did not believe in cattle losing large portions of this organ. In his cases the loss did not alter the ordinary appearance of the appendage.

In terminating his contribution, Boulay states that of the inoculated cattle which were afterwards fed, fattened, and slaughtered, many had a portion of the lungs indurated; this he looks upon as an evident proof of the efficacy of inoculation, for he resorted to the measure in cowsheds which were already invaded by the malady, in some of which it ceased soon after the cattle were operated upon, and though some of them were affected, they recovered when inoculated.

All the animals remained in perfect health, and those intended for the butcher never ceased to thrive well and to fatten.

The disease only makes depredations when its existence is not declared, and the owners refuse to benefit by the advice of competent men, concealing its existence as long as they can.

CENTRAL VETERINARY MEDICAL SOCIETY.

The first ordinary meeting of the present Session was held at 10, Red Lion Square, on the 5th inst., the President, J. Roalfe Cox, Esq., in the chair. After an acknowledgment from the President, of the honour of his election, the adjourned discussion on the subject of "Datura Tatula," was proceeded with, when Mr. J. Moore, sen., said he had used it in the first solution, 1 drop + 9 of spirit in a wineglass of water three or four times a day, for the last twenty-three years, chiefly for epilepsy in the horse. Mr. Clark said that he had smoked it during the winter months, and at nights for sleeplessness; he suffered from a structural derangement of the lower part of the left lung. After further remarks the subject was again adjourned.

Mr. Woodger, sen., laid before the meeting a portion of the upper part of the spinal cord of a horse. During the animal's life there had been a swelling on one side of the head near the dentata; it was treated with a cooling lotion; an abscess formed and was blistered. The animal grew so violent as to be unapproachable, and eventually becoming paralysed was killed. Three cervical bones and the brain were sent for examination. The brain was unaffected, the spinal cord at the upper portion was highly congested, as was also the base of the canal of the dentata; here was also a small quantity of pus found.

The President called attention to the following case of embolism of the heart. The subject was a valuable draught horse seven years old, belonging to a distiller. Last February it was taken ill with pleurisy. The horse was brought to the infirmary and was treated; he soon on recovered sufficiently to return to work, but the pulse remained intermittent. If compelled to work hard, the horse fell off his feed, so that he was constantly requiring medical attention; eventually the owner gave the horse to him, and he put him to light farm work; he still fell off his feed, but was no worse till a month ago, when he attracted particular notice from his strange behaviour. He was found one morning standing immovable in a field with his legs drawn under him. A loose halter was upon his head, to which was still attached a part of the manger, which he had pulled down from the stable; the interior of the stable was the scene of sad havoc. The carter led the horse to another stable and tied him up, when he jumped into the manger; the man ran off, and the animal broke away again and was next observed sitting on his haunches on some straw, otherwise behaving quietly, but would not bear the restraint of tying up. When excited by

movement he seemed uncertain about his actions, and on an attempt being made to lead him to a safe place he broke away and ran forward at a strange ambling trot. Orders were given for him to be shot. A *post-mortem* examination was made, when heart disease was very evident. The mitral valves were very much thickened with small sand-like deposits, while attached to the valves was a long string of fibrin so tough as to require some force to break it; this was considered to be the result of previous disease.

Mr. F. J. Mavor asked if there were any disease of the wall or muscular structure of the heart; also, if Mr. Cox thought it possible that the clot being as he supposed previously fixed, a portion should have become detached and by passing towards the brain at times have caused the occasional symptoms described. He did not himself think the clot could have been long formed, but believed that it was recent. Further discussion ensued, in the course of which regrets were expressed that the brain was not examined, as the symptoms were so nearly allied to those of a phrenitic affection. It was suggested that in cases prussic acid might be employed for the purpose of destroying life.

The President, in replying, explained that the clot was unlike those found in the heart as the result of sudden death. He did not consider that it should be called a "clot," it being a string of fibrin not very thick, somewhat of a drab colour, and not moulded to any part. It struck him as being rather a large heart; usually there was no thickening, but an apparent dilatation of the cavities; clots or polypi in the heart of the human subject were solid throughout. The carter had noticed the day previously to the attack described that the horse did not keep straight in the furrow while at work on the farm.

The meeting then adjourned.

Present:—Thirteen fellows and one visitor.

JAMES ROWE, Jun., *Hon. Sec.*

LANCASHIRE VETERINARY MEDICAL SOCIETY.

A QUARTERLY meeting of the above Association was held at the Blackfriars Hotel on Wednesday, October 7th, 1874, W. A. Taylor, Esq., President, in the Chair. The following gentlemen were present:—Professor Walley, Veterinary College, Edinburgh; Messrs. T. Taylor, Locke, J. Lawson, Hopkins, Brown, Prescott and Roberts, Manchester; W. C. Challinor, Woods, Welsby and Lawson, Whittle and Taylor, Ashton; Howell, Lomas, Woolner, A. Challinor, Ferguson, Lowe, Johnson and Briggs, Bolton.

The following gentlemen were nominated for membership:—

Mr. Ogden, Sale; Mr. Shornley, Newtonheath; Mr. Bowker, Farnmouth; Mr. Brown, Manchester; Mr. Darwell, Northwich; Mr. Bird, Bolton.

After the transaction of the ordinary business, the President called upon Mr. Lomas, who read a lengthy and valuable paper on *Eczema Epizootica*. In the discussion which followed, Professor Walley dilated freely on the essay, and spoke of several interesting cases which he had seen in Iceland cattle closely resembling rinderpest, so much so that a novice might easily mistake them for that disease. He also exhibited some very interesting specimens and diagrams, specially one of the kidneys of a pig which had been sent to the College by Mr. Dow, and in which the whole of the medullary portion of the gland had been absorbed, leaving a lump of rough fibrinous substance. Both the kidneys were in the same condition. The pig was said to have shown no symptom of renal disease.

Professor Walley expressed his pleasure at coming among the members again, and thanked the Society for the support they had given to the petition on behalf of the students, and their examination by the Royal College of Veterinary Surgeons.

Mr. Welsby, cattle inspector for Liverpool, said that the sheds in which the cattle were weekly housed were not properly disinfected, and that, in his opinion, this was one of the greatest means by which mouth-and-foot disease was spread. He added that he had made many post-mortem examinations and had frequently found vesicles in the third and fourth stomachs, but he had never met with them in the respiratory organs.

Mr. Howell, *Mr. Lawson*, Bolton, *Mr. Challinor*, and several other gentlemen, addressed the meeting.

A vote of thanks was given to Professor Walley for his lucid remarks on the essay, and for the additional information afforded by the specimens.

A vote of thanks to the essayist and the President brought the meeting to a close.

Mr. Dacre, Altrincham, promised to read a communication on Fractures at the next meeting.

LIVERPOOL VETERINARY MEDICAL ASSOCIATION.

The fortieth quarterly meeting of the above Association was held in the Medical Institution, Hope Street, on Friday evening, 13th November, 1874, the President, George Morgan, Esq., in the chair. The following gentlemen were present:—Messrs.

Reynolds, Sumner, Harwood, Morgan, Thomas, Leaney, Mills, Fenton, and the Secretary, Liverpool; W. C. Lawson, Wootton; Woods, Wigan; Messrs. Greaves and Faulkner, Manchester. Letters of apology were received from Messrs. Roberts, Hopkins, and T. Taylor, Manchester, W. A. Cartwright, Whitchurch, and H. Barnes, Malpas. The minutes of the previous meeting having been signed,

The President called upon Mr. Faulkner, of Manchester, to open the discussion on Mr. Kenny's essay "Bowel Complaints," which he did by reading a short paper containing a history of several very interesting cases which had occurred in his practice during the past few months. One case in particular in which the symptoms were of the most dangerous character, indicating, in fact, that it was a case of twisted bowels. However, to his great surprise, the symptoms gradually abated and the animal quite recovered, upon which he came to the conclusion that the case had been one of twisted bowels, but that during the violent struggling and rolling about the bowels righted themselves; hence the recovery. Mr. Faulkner also detailed the particulars of a case of obstruction of the bowels in which after frequent explorations he succeeded in removing a calculus from the rectum. The animal soon recovered, became free from pain, and apparently convalescent, but ten days afterwards the abdominal pains returned. On exploring and clearing the rectum Mr. Faulkner found a rupture of the intestine existed. By removing the fæces twice daily and dressing the parts with a solution of belladonna, the animal recovered in about three weeks.

Mr. Greaves said he had that day made a *post-mortem* examination of a very valuable horse that had died from obstruction of the bowels, and found a soft spongy calculus about sixteen inches from the termination of the rectum. He (Mr. Greaves) had not the slightest hesitation in saying that had the veterinary surgeon who attended the case explored the rectum, he could not have failed to have reached the calculus, and thus have saved the animal's life. Mr. Greaves strongly urged the importance of frequently exploring the rectum, as he had by that means often been successful in reaching and removing obstructions and saving his patients.

Mr. Sumner said it was his custom to give chloroform in a drench in all cases of acute bowel complaint, and it always had a powerful sedative action, and indeed sleep. He had found as many as 158 calculi in a horse after death in one case, and 132 in another; but they were all of the soft spongy kind and small. He was anxious to know the cause of these formations, as he felt sure it must be more than the food and water. It is often found that horses which are fed on the dirtiest food are free from

intestinal calculi, whilst others fed with the greatest care are subject to them. Several members asked if it were possible to determine how long a moderate-sized calculus was in forming, as it might be of great value in a legal point of view.

Mr. Sumner said, he had a case which he thought threw some light on the subject. He made a *post-mortem* examination of a horse that had died from a calculus weighing from seven to eight pounds, and in breaking it (in the presence of the owner and horsekeeper) to see what the nucleus consisted of, he found that it was a button. As soon as the horsekeeper saw the button he exclaimed, "That's my button." Upon asking for an explanation, it appeared that about six years previously the horse made a bite at the horsekeeper, and tore a part of his jacket away and with it this button, for which he searched the stall and stable carefully at the time, but could not find it. He had, however, not forgotten the circumstance, and recognised the button as soon as he saw it, from its particular make.

The case was considered to be highly valuable, as furnishing some data relative to the length of time that a large phosphate calculus might take in being formed.

During the discussion several members strongly recommended repeated small doses of aconite in acute abdominal cases in preference to opium; but one or two others said they had seen such ill effects from its administration that they had discarded it altogether. The general opinion appeared to be, that it was better to administer aconite in a ball, as all its sedative effects were produced without any local irritation. After each member had spoken, *Mr. Faulkner* replied, and summed up in an able manner, remarking that the discussion had been interesting, instructive, and exhaustive—an opinion which was fully endorsed by all present.

A cordial vote of thanks was given to Mr. Faulkner for his very interesting paper. The meeting, after tendering a hearty vote of thanks to the retiring President, Vice-Presidents, Treasurer, and Secretary, for their past services, elected George Morgan, Esq., *President;* Messrs. Reynolds, Harwood, and Sumner, *Vice-Presidents;* W. Woods, Esq., *Treasurer*.

Mr. C. W. Elam was requested to continue his services as *Hon. Secretary*.

The President announced that Mr. Sumner would read a paper at the next meeting.

The following gentlemen were nominated for membership:—Messrs. Thomas, Leaney, Mills, and Fenton, Liverpool; and F. Wall, Warrington.

C. W. Elam, *Hon. Secretary*.

OPENING OF THE EDINBURGH VETERINARY COLLEGE.

(*From the 'North British Agriculturist.'*)

As we briefly noticed last week, the winter session of the college was opened on Wednesday afternoon [Oct. 21st] with an inaugural address, in the Council Chambers, by Principal Walley. There was a large attendance of ladies and gentlemen. The Lord Provost presided, and among the gentlemen present were Bailies Cousin, Howden, Methven, and Marshall, Treasurer Colston, and Dean of Guild Craig, Captain Tod of Howden, and Mr. James Wilson, Wester Cowden, as representing the Highland and Agricultural Society; General Anderson, C.B., Royal Artillery; and Mr. F. J. Day, V.S., York.

The Lord Provost, in opening the proceedings, said he was glad to have the honour of installing Dr M'Kendrick as Professor of Physiology in the Edinburgh Veterinary College. (Applause.) His Lordship then said—This meeting is held to inagurate the session of 1874-75. Professor Dick commenced a series of lectures in 1818 on veterinary medicine and surgery, and in 1823, under arrangements with the Highland and Agricultural Society of Scotland, the students attending Professor Dick's College, after being examined by that body and found qualified; and by the Royal charter constituting the Royal College of Veterinary Surgeons of 1844, Professor Dick's College was admitted to the same privileges as regards position in teaching as the Royal Veterinary College of London. Professor Dick, who stood at the head of his profession, and who was appointed to the establishment of Her Majesty's stables in the year 1837, conducted the institution with very great success, and turned out gentlemen of eminent position in the veterinary profession. The professor himself, having long been a member of this incorporation, left his whole means and estate to the Town Council in trust for the purpose of carrying out, after his death (which happened in 1866), what had been his chief aim during his life—viz., the advancement of veterinary science. The Town Council accepted of the trust, and it has continued to be managed by them since that time with varied success. Difficulties arise in the management of almost every trust, and it is not remarkable that difficulties should have arisen in a trust of such magnitude as that reposed by the late professor in the Town Council, who, considered individually, are not permanent trustees, but are, as a body, subject to be changed from year to year. (Hear, hear.) The trustees have now appointed a most efficient staff of teachers in the institution;

and in addition to the former professors, the services of Professor Walley and that of Mr. Baird have been secured, and thus the students shall receive practical as well as theoretical instruction daily. He afterwards said no college in the kingdom, he believed, would be so well guided as that which had received the sanction of the Corporation. He had conversed with the gentlemen appointed to situations of trust, and from that conversation he believed they would work harmoniously together. They had the confidence of the Corporation, and if they only had confidence in themselves he had no doubt success would attend their future efforts. He then called upon Professor Walley to deliver his inaugural address.

Professor Walley said, before commencing the subject matter of his address he might be allowed to thank the Town Council for the honour they had conferred upon him in electing him Principal of the Edinburgh College. He was loth to believe that an institution like the Veterinary College of Edinburgh, founded as it was by one man, reared by the indomitable will, the perservering energy, and the determination of that one man, and endowed by him at his death, could ever become a thing of the past. (Hear, hear.) He was also sanguine enough to hope that many of those gentlemen, members of his profession, claiming the Edinburgh Veterinary College as their *alma mater,* who from various causes had become alienated from it, might yet be found returning to their old love. He then proceeded to say that he would divide his address into three sections—first, to give some idea of the scope and aim of the profession; second, to give the students an insight to the work which lay before them; and, lastly, to give the students advice as to their conduct during their connection with the college. Having premised that the veterinary profession was little known in Scotland, inasmuch as there were more registered practitioners in Lancashire and Yorkshire than in the whole of Scotland, he proceeded to state that the veterinary art was noble and merciful, that it was ancient, that it was of use to the general community, and that it was charitable, because it gave to those who could give nothing in return, and that it was intimately connected with the practice of human medicine. The veterinary surgeon, he said, thought to prevent cruelty and disease, but the profession was not supported and fostered in Great Britain as it was in many of the Continental States. No Government grants strengthened and aided schools. No state payments assisted its professors to carry on experimental inquiries. And this was not all, for in this country the advice of veterinary surgeons, men best qualified to judge of such matters, was often cast aside and other advice accepted. In the time of the cattle plague, when veterinary surgeons were demand-

ing isolation and stamping out, medical men were suffering from a vaccination mania, and the people shared and supported that mania until, after the loss of many valuable animals, the mistake became palpable to all. And so with pleuro-pneumonia, a bane not one whit less virulent than cattle plague. While veterinary surgeons agreed that it was not safe to allow of the removal of animals from or into diseased byres, under a period of at least three months, the Legislature fixed such period at 30 days, and what was worse, appointed as inspectors men who, in some instances, could scarcely distinguish a horse from a cow, except that the latter had horns, and that the foot of the former was not cloven. In regretting that the State gave no support to veterinary science, it must not be forgot that private societies gave a little. The Royal Agricultural Society of England, supporting in some measure the pathological department of the London College, and the Highland Society of Scotland, up to the present, had given £100 annually to the Comparative Pathology Chair of the Edinburgh College, while it now set aside £15 and two prizes of ten guineas for essays on particular subjects in connection with cattle. With regard to this matter of prizes, he must confess that he was sceptical of the amount of good which such prizes would produce. Little results other than theoretical could be by this means obtained, for the simple reason that no private individual could make experimental or practical researches on a subject where the purchase of one animal for the purpose of carrying on such research would involve an outlay of considerably more than the prize was worth. He ventured to ask whether greater and more valuable and more lasting results might not have been attained had the Highland Society appointed a commission supplied with the necessary pecuniary aid to inquire practically into the subject upon which it wished to gain further information. Under the second section of his address, the Principal said that the subjects which the veterinary student had to learn had been somewhat increased, and a higher standard of knowledge had been demanded from them. He hoped the day was not far distant when the standard of the matriculation examination would be made higher, and when the terms of study of the student would be extended before they could go in for final examination. He concluded by giving advice to the students, urging them to trust their teachers, believing it was the determination of those gentlemen, and their desire, to aid the students in attaining a knowledge of the several subjects they had to study.

The Lord Provost said, in the address to which they had listened they had an earnest of the ability which was to be brought to bear upon the college, the session of which was just com-

mencing. He moved a cordial vote of thanks to Professor Walley for his able address. The ladies and gentlemen who had favoured the meeting with their presence were also deserving of praise, especially those gentlemen connected with the Highland and Agricultural Society.

Captain Tod, on behalf of the Highland Society, returned thanks. It was the wish of every member belonging to the society that the old college in Clyde Street should go on and prosper. (Applause.) The society never wished to patronise one body more than another. They were merely an examining body now-a-days, and students, whether they came from Clyde Street, Grayfield Square, or the college in Glasgow, all came before the society on the same footing. He hoped that the Clyde Street College would continue to go on and prosper. (Applause.)

The meeting then separated.

OPENING OF THE NEW VETERINARY COLLEGE.

The winter session of the New Veterinary College, Edinburgh, was commenced this afternoon [Oct. 28th] at three o'clock, when Principal Williams delivered his introductory address to the students in the presence of a large assemblage. At the outset of his address Principal Williams referred to the circumstance that at this time last year the college did not posses the authority from the Government by which its students were entitled to present themselves for examination, and to obtain the diploma and qualify them as veterinary surgeons. He expressed his gratitude to those gentlemen who assisted him in his application to the Government, and to the members of the veterinary profession generally, to the Highland Society for its position of neutrality in the matter, and also to the students who followed him when it was uncertain whether Her Majesty's sign-manual was to be obtained. He pointed out that there was some opposition to him obtaining it. Now, he said, that his endeavours had been crowned with success, it was not for him to say much against the cause of delay, but it did not seem odd that those gentlemen who went to London to oppose his application should represent this city in Parliament as free traders, and that the sign-manual should be granted to him upon the ground that there should be free trade in teaching as well as in commerce. That opposition, however, by causing delay entailed heavy pecuniary loss upon him; for many of the students who had intended to study with him, afraid that they

would lose their session, left Edinburgh, and studied somewhere else. At the risk of offending the sense of what was right in some people who maintain that an introductory address should be one of advice to students only, he felt compelled to touch upon two subjects, which were to some extent agitating the public mind. In the first place, he would briefly inquire why we had pleuro-pneumonia amongst our cattle, and how it was the Contagious Disease (Animals) Act of 1869 had not suppressed the malady? This Act was expected to put an end to outbreaks of contagious diseases, but so far it has failed to do so. It was naturally asked what was the good of it? The expenses connected with it were very great, and beef was as dear, even dearer than it was in 1869. Opinion, he said, was changed as to the contagiousness of this disease, and some who were warm supporters of the theory of its contagious origin were now casting doubt upon that. He expressed himself still a firm believer, however, that the disease was introduced by contagion, and that its suppression could only be effected by applying the Act even with greater severity than at the present time. He was of opinion that the disease would be amongst us so long as people were allowed to introduce fresh or healthy cattle into affected byres or to mix healthy cattle with those which had been subjected to contagion. The slaughtering clause of the Act should, he thought, be applied to Ireland, and the period of quarantine, which now extended over thirty days only, should be extended to two or even three months. The subject of inoculation which had proved eminently satisfactorily in Australasia and on the Continent should, he thought also, be further tested in this country. The second popular subject was that of the grouse disease. Dismissing the various theories which had been promulgated, he would state that he had studied the matter carefully and made many experiments and *post-mortem* examinations, and felt satisfied that it was due to a *nematode*, or round worm, termed by Dr. Cobbold *strongylus pergracilis*. In some specimens he had examined tape-worm was found, but in many instances the tape-worm was absent, and the presence of the tape-worm did not cause disease. In all cases, however, the small round worm had been found, and even if absent in the intestinal canal, it had been found in the walls of the intestines, discoverable only by the microscope. He was satisfied that the suppression of the disease could only be brought about by destroying, in the first place, all weakly birds, the burning or otherwise destroying of all dead birds. It had been demonstrated that the parasites passing from the bodies of affected birds became deposited upon the heather, and that they or their ova were eaten by healthy birds, and afterwards propagated themselves within the bodies of those birds. The dead

bodies decomposed upon the ground gave exit to the worms which had been contained in them, and in this way the feeding ground became tainted. Burning of heather had been recommended by various writers upon other grounds than the presence of parasite. The lecturer was of opinion that burning heather, by destroying the parasites and ova by which it was tainted, would in all probability put an end to the disease. Principal Williams further impressed upon the students the necessity of becoming acquainted with the science of pathology or the nature of disease, and that without this knowledge the application of remedies became a piece of mere empiricism or quackery. In order to obtain a knowledge of pathology they must become acquainted with the natural physiological actions which went on in the body during life, for those which constitute diseases are often but perversions of the physiological ones. The Principal then pointed out that much of what had been done in the present day owed its origin to some observations of the late Professor Goodsir, who, before he became the Professor in the University, had investigated those changes which occur in the bowels by typhoid fever in man, and that much of the system of cellular pathology owed its origin to those observations of Goodsir. After dwelling on this subject for some time, the Principal proceeded to say there were many schools of medicine. Some advocate one method of treatment, some another; that there was a wide difference between the heroic method and the homœopathic, and that between these two there were several systems. An inquiry into the origin of those contradictions in medicine would prove that if the true nature of disease were better understood its treatment and cure would not rest upon men's peculiarities of opinion. He next dwelt on the difficulties a veterinarian had to contend with, as compared with those of the human doctor. The former was compelled to form his opinions of disease without the expressed or verbal assistance of the patients, and indeed without any positive signs whatever. He impressed upon the students the absolute necessity of observing every lame and sick animal which might come before them in the practice of the college, and even in the streets of Edinburgh, which was famed for the number of its lame horses, and thus presented opportunities which they would scarcely have anywhere else. He also reminded them that after they had completed the prescribed course of studies, and obtained the diploma, they would find that the difficulties were not overcome. They would have to remain students throughout their own lives. The only distinction between the period before and the period after passing their examination would be that, in the former they were answerable for the extent and thoroughness of their information to the teachers and examiners, whereas in the latter they were

responsible to every one who might employ them. The teachers, however, could only guide them into proper channels of thought, and supply them with facts for their guidance in life. More than this they must not expect. Nay, indeed, were they blindly to follow the teaching of any man without acquiring knowledge for themselves by observation, in fact by self-education, they would fall behind others perhaps their inferiors at the start.—*North British Agriculturist.*

OPENING OF THE GLASGOW VETERINARY COLLEGE.

On Wednesday afternoon [Oct. 28th] the session of this College was formally opened by an introductory address from Professor Knox, of the University. There was a good attendance of students. Principal M'Call was present, and Professor Young, of Glasgow University, presided.

Professor Knox at the outset referred to the fine new buildings into which they had just entered for veterinary study. He believed that the establishment was now one of the most complete in the kingdom with regard to the conveniences which it possesses for the imparting of veterinary knowledge. To Professor M'Call, who had in late years made strenuous efforts in the spreading and perfecting of veterinary knowledge, the high status to which that profession had now reached was largely due, and it was to his liberality and hard work that the new buildings were to be credited. (Cheers.) Professor Knox then went on to detail the history of the College since its formation. It was in a small room, he said, off a shoeing forge in Sauchiehall Street, that the College first sprang to life. There, in the November of 1861, thirteen years ago, three students met, but towards the end of the session the number was increased to eight. All these were amateurs who came for an hour in the evening to hear the lectures delivered out of a true desire to increase their zoological knowledge. The next session opened with advancing prospects. Ten students were enrolled, five of whom were intending professionals and the other five amateurs. During this session Mr. M'Call, their now esteemed Principal, lectured for three hours each day on anatomy, physiology, and surgery, and the students were allowed to attend for materia medica and chemistry the classes of Dr. Morton and the late Dr. Penny, in the Andersonian University. In 1863 Mr. M'Call applied for the partici-

pation of the charter of the Royal College of Veterinary Surgeons, and in spite of opposition his application was granted by the Government. Professor Andrew Buchanan, his brother (then member of Parliament for the city), the Duke of Argyll, and others interested themselves in obtaining this inestimable boon. In 1863-64 Mr. M'Call, in order to provide increased practice for the students, erected new premises in Parliamentary Road, with a forge, hospital, dissecting-room, and other convenient departments. At that time there were nine students, six of whom were professionals. Lectures were then delivered by Dr. Clelland, now Professor of Anatomy in Queen's College, Galway; in 1864-65 there were 19 students, 4 of whom were amateurs and 15 professionals. In 1865-66 the number of students were only 14, and the falling-off is accounted for by the fact that a preliminary examination for intending students was that year for the first time insisted upon. In 1866-67 there were 16; in 1868-69 24, and in 1869-70 the number was also 24. In 1870-71 there were 28; in 1871-72, 39; in 1872-73, 44; and last year there were no fewer than 52 students upon the roll. (Cheers.) The prosperity of the institution was thus very well shown by the comparative attendance of students since first established; but the best criterion of its success lay in the fact that 92 per cent. of the men who had attended the College had passed their examinations and obtained their diplomas. (Cheers.) Two or three years ago, however, Principal M'Call found the premises in Parliamentary Road too small, and the latest results of his enterprise are those fine new buildings which when finished will be the most complete for the training of veterinary surgeons in Scotland, if not in Great Britain. (Cheers.) Professor Knox then called for a vote of thanks to the Principal, and, in the words of Horace, expressed the hope that he "long might live to enjoy the fruits of his labours, amidst the congratulation of his friends." (Loud cheers.) He then went on to give a salutary advice to the students as to the way in which they should proceed with their studies, arguing that a still longer curriculum than two years was, however, desirable. He had to intimate at the close of his address that Professor Allen Thomson, of the University, chairman of the Examining Board, who was unable to be present on account of illness, intended giving a prize of six guineas for the best dissection, to be made in the dissecting-room during the ensuing session. (Cheers.)—*North British Agriculturist.*

CONTAGIOUS AND INFECTIOUS DISEASES IN ANIMALS.

At the meeting of the Metropolitan Board of Works held Nov. 13th, at the office in Spring Gardens, Colonel Sir J. M. Hogg, M.P., in the chair,

Mr. Redman, the chairman of the Cattle Diseases Act Committee, brought up a report upon the above subject as follows:—

"Acting on the intimation conveyed in the report of your committee presented to the Board on the 16th ult., to the effect that proceedings would be taken against all persons found contravening the Contagious Diseases (Animals) Act, your Committee have now to report that proceedings have been taken against Mr. Abbott, of Old Bethnal Green Road; Mr. Cranfield, of Walwoth Road; and Mr. Stathem, of Gould Square, for offences under this Act. Mr. Abbott was summoned for not giving notice of the outbreak of of glanders in his stock, and for leading a horse on the public highway affected with that disease. Convictions were obtained on both charges and fines and costs amounting to £13 6s. imposed. Mr. Cranfield was summoned for not giving notice of the outbreak of glanders in his stock. No less than five horses were found affected when the inspector examined the animals, and in the result seven horses had to be slaughtered. The defendant, by his solicitor, admitted the offence, and pleaded extenuating circumstances, and asked that a nominal penalty only should be imposed, but the magistrate, in the result, inflicted a fine of £10 and 14s. 6d. costs. Mr. Stathem was summoned for using a horse on the highway affected with farcy. The defendant pleaded guilty to the charge, but stated that the horse was used without his knowledge while away from home; but the magistrate declined to admit that as a sufficient excuse, and imposed a fine of £5 and 14s. 6d. costs. Your committee trust that these convictions will have the effect of inducing owners to give notice of the outbreak of these contagious diseases."

The report was received and adopted.

The rest of the business was disposed of, and the Board adjourned.

APPOINTMENT OF PORT-INSPECTORS.

There are several vacancies which it is proposed to fill as early as possible. Candidates are requested to send their names to the Principal of the Royal Veterinary College.

ROYAL VETERINARY COLLEGE.

Clinical Clerks.

By an oversight the name of Mr. J. Stevens, M.R.C.V.S., St. Austell, was omitted from the list of gentlemen (published in our last number) to whom certificates were awarded for having officiated as Clinical Clerks, while students at the Royal Veterinary College.

Freshmen.

We have to add the names of Mr. James J. Williams and Duncan B. Clinch to the list of Freshmen who have entered on their studies at the College.

OBITUARY.

We have to record the following deaths:—Mr. Chas. John Grey, M.R.C.V.S., Royal Artillery. His diploma bears date April 26th, 1870.

Mr. James Lowe, M.R.C.V.S., of Bolton-le-Moors. His diploma bears date May 17th, 1855.

ERRATUM.

In the list of Freshmen published in our last issue, the name of "Mr. J. C. Bennett" was inserted instead of "J. C. Bonnett."

INDEX.

A.

Absorptiometry, on, 845
Accident in the hunting field to a veterinary student, 79
Acid, iodic, in hypodermic injections, 105
santonic, 809
Acids in normal urine, the presence of bile, 31
Acid, the purification of hydrochloric, 31
Act of vomiting, Greve on the, 852
'Actions and uses of Veterinary Medicines,' fourth edition, 165
Action of air and water upon lead, 808, 809
atmospheric nitrogen in vegetation, 721
different chemical agents on the hæmatopinus vituli (louse of calf) experiments with the, 21
induced electricity upon air, 672
medicines, on the, 56
ranunculacæ on the horse, 654
sugar and sulphuric acid on some alkaloids, 584
Actual cautery, use of the, 533
Acute inflammation of the kidneys, hypertrophy and, 100
Addition of fat to the food, influence of the, on its digestibility, 133
Address by Mr. Newdegate at the opening of the College, 779
Adhesive attachments, diffused struma, with extensive, 153
Adulteration and supply of milk, 241, 325
'Africa, Heart of,' Schweinfurth's, 289
Agents affect the secretion of bile, how different, 162
on the hæmatopinus vituli (louse of calf); experiments with different chemical, 21
Agricultural, Royal, Society of England, 69, 274
Highland, Society and the Veterinary Schools of Scotland, 212
Agriculture, consular reports upon—Turkey, 684
Air and water, action of, upon lead, 808, 809
A king's tribute to a veterinary professor's worth, 376
Albumen, coagulation of, 583
Albumin, seat of decomposition of, in the animal organism, 842
Alcoholic, acetic and lactic fermentation in milk, 30
Alkaloids, action of sugar and sulphuric acid on some, 584
A memorial to Bourgelat, 145
American horse disease, the, 28, 357, 492, 588
Ammoniacal salts, a productive source of, 721
Ammonia, phenate of, 758
Anæsthetic, benizne as an, 528
Analysis of ewe and goat's milk, 838
Anatomy and physiology of the kidneys, 200
Anecdote of the late Mr. Peech, 216

A new form of portable microscope, 401
Animal organism, combustion in the, 753
seat of decomposition of albumin in the, 842
parasites, remarks on the classification of, 7
Animals as motor powers, 808
bovine, osteoclasty of, 525
consumption of water by, 31
contagious and infectious diseases in, 943
how to kill mites, ticks, and lice affecting the lower, 98
the effects of fresh choleraic excretions on, 33
(Amendment) Order, 701
Animal tissues, on the nutrition of the, 858
Anniversary, Hertwig's fiftieth professional, 440
Annual Meeting, Royal College of Veterinary Surgeons, 441
A peculiarity of capillary blood, 489
A Pharmacopœia, including the Outlines of Materia Medica, for the use of Practitioners and Students of Veterinary Medicine,' second edition, 167
A poisonous composite plant, 130
Apoplexy, parturient, in a mare, 768
in the cow, 800
in the mare, 652, 713
splenic, 671
Application of morphia suppositories in veterinary practice, subcutaneous, 26
Appointment of port inspectors, 787, 944
Appointments, army, 288, 464
A productive source of ammoniacal salts, 721
Areca palm, notes on the, 250
Army appointments, 288, 464
veterinary surgeons during war, 754
Arrest, artificial, of growth of long bones, 489
Artificial arrest of growth of long bones by irritation of the epiphyses, 489
Atmospheric dust, microscopic characters of, 197
nitrogen, action of, in vegetation, 721
Atrophy of the liver with dilatation and impaction of the biliary ducts, with sand and other earthy matters, 221
Atropine, hypodermic use of in tetanus, 908
Australia, live stock in, 201
parasitism in, 318
shipping sheep to, 458
Australian meat, 587
Award, Coleman prize, 632
Axe, Assistant-Professor, his remarks on the larva of the helophilus, an equine parasite, 10
presentation of a testimonial to, 288
records a case of atrophy of the liver, associated with dilatation and impaction of the biliary ducts with sand and other earthy matters, 221
records a case of congenital hydrocephalus in a fœtal ass, 417
reports a case of tuberculous deposit associated with sphacelus of the liver of a cow, 147

B.

Bacteria, mode of multiplication, 163
transformation of, into microzymes in the alimentary canal of animals, 235
Barker, L. S., his communication on fracture of the parietal bones in a horse, 66
Bearing-rein, the, 865
Bees or wasps, lime water in stings of, 236
Benzine as an anæsthetic, 528
Bile-acids in normal urine, the presence of, 30
Bile, how different agents affect the secretion of, 162
Bill, remarks on the Juries', 304
Bite of the skunk, 759
Bleaching powder, nature of, 810
the constitution of, 523
Blood, capillary, a peculiarity of, 489
lamb's, transfusion of into man, 366
of different kinds of animals, transfusion with the, 683
poisoning experiments, 5, 88, 234
vessels, on the torsion of, 850
Brown, Professor, his essay on 'Foot-and-Mouth Disease of Cattle and other animals; with remarks on the General Characters of the Malady, and the causes which led to its recent extensive prevalence in this Kingdom,' 109, 179, 341
Bones, colouring of, through madder feeding, 844
influence of forage on the composition of the, 528
in horned cattle, brittleness of the, 30
of animals fed with food containing lime and phosphoric acid, composition of, 583
the chemistry of the, 811
Botanical excursions, Royal Veterinary College, 461, 557
Botany, the principles of, 11, 88, 155, 226, 300, 417, 482, 561, 649, 672, 705, 793, 898
Böttger, R., on the action of induced electricity upon air, 672
Bottles, zinc caps for, 236
Bourgelat, a memorial to, 145
Bovine animals, osteoclasy of, 525
Brain, composition of the grey and white susbtances of the, 29
Briscoe, B., his obituary, 464
Brittleness of the bones in horned cattle, 30
Brown, Professor, his remarks on foot-and-mouth disease of cattle and other animals, 109, 179, 341
Brussels, university of, 754
Buckman, Professor, his principles of botany, 11, 88, 155, 226, 300, 417, 482, 561, 649, 705, 793, 898
Burness, A. G., a review of his work on the 'Specific Action of Drugs on the Healthy System,' 240
Bursottee, observations on, 791
Butyric fermentation, 907
Byron, T. A., his obituary, 632

C.

Calculi, specimens of intestinal, 891
Calf, louse of, experiments on the action of different chemical agents on the hæmatopinus vituli, 21
Calves, husk in, 24
Camphor and chloral hydrate, 720
Cancerous deposit in the eye of a horse, 308
Capillary blood, a peculiarity of, 489
Carbolic acid, parenchymatous injections of, 908
Carbonic acid, decomposition of leaves by, 906
Carcases, compulsory slaughter of cattle affected with pleuro-pneumonia, and the disposal of the, 107
Carnivorous plants, 846
Carrier-pigeon, the, 907
Case of disease of the vertebræ, 151
fracture of the parietal bones in a horse, 66
supposed poisoning of calves from eating yew, 901
case of traumatic tetanus, cure of a, 437
Cases of lead-poisoning in horses, three, 93
poisoning in horses, 646
post-mortem by Mr. Milnes, 647
chemical analysis by Professor Tuson, 648
Cat, tinea favosa from a, 699
Cattle affected with pleuro-pneumonia, and the disposal of the carcases, compulsory slaughter of, 107, 895
contagious diseases of—Norfolk report, 131
brittleness of the bones in horned, 30
disease at Natal—redwater, 734
disease of, 464, 546, 548
discussion on the diseases of, 456
importation of foreign, 631
Irish, 549
in London, the effects of the fog on, 1
inspection and the police, 237
Irish, diseases acts, 399
plague, 97, 103, 160, 232, 311, 423, 488, 582, 671, 719, 806
legislation in Hungary for the suppression of the, 253
pleuro-pneumonia of, how is it spread? 881
red-water of, 216
refreshment trucks, 144
trade, 658
Cat, transference of ringworm from a, 682, 699
Cautery, actual, use of the, 533
Centenary of the Copenhagen Veterinary School, 377
Central Veterinary Medical Society, 55, 215, 258, 452, 530, 930
Changes in the vegetation of South Africa, 815
which flocks and herds undergo from external causes, 821
Chemical agents on the hæmatopinus vituli (louse in calf), experiments on the action of different, 21
Chemistry, experiments in the domain of forensic, 106
of the bones, 811
Chicken, parasitic disease in a, 372
Chloral hydrate and camphor, 720
in traumatic tetanus, 908
Choleraic excretions of animals, the effects of fresh, 33

Chronic rheumatism in the horse, successful treatment of, 307
roaring, etiology of, 755
Classification of animal parasites, remarks on the, 7
Club, Farmers', 241, 325
Coagulation of albumen, 583
Coates, W. H., his communication respecting presentation of specimens of intestinal calculi, 891
Cobbold, Professor, his extract from Wislicenus on trichinosis, 522
his observations on rare parasites of the horse, 81
his further remarks on rare parasites from the horse, 217
his lecture on parasites, 168
his remarks on Mégnin's tapeworm, 640
his remarks on the classification of animal parasites, 7
his remarks on the fatal epidemic affecting ponies, 314, 403
his report on parasites from India, 788
his revised history of entozoa, 296, 472, 693, 887
Coïtal exanthema in horses, 757
Colouring of bones through madder feeding, 844
Composite plant, a poisonous, 130
Coleman prize award, 632
medals, presentation of, 778
College fund, 71, 139, 286, 447, 461, 764, 877
College, Royal Veterinary, botanical excursions, 461, 557
Collins, F. F., his observations on bursottee, 791
Colloidal membranes of vegetable origin, passage of gases through,
Combustion in the animal organism, 753
Comminuted fracture of the pelvis, with extensive complications, in a mare, 22
Composition of the bones, influence of forage on the, 528
of animals fed with food containing lime and phosphoric acid, 583
of the grey and white substances of the brain, 29
Compound dislocations of the fetlock joint, recovery, 412
Compulsory slaughter of cattle affected with pleuro-pneumonia, and the disposal of the carcases, 107, 895
Congenital hydrocephalus in a fœtal ass, 417
in a fœtal foal, 481
Congress, proposed ophiological, 248
Conspectus, the veterinarian's pocket, 167
Constitution of bleaching powder, 523
Consumption of water by animals, 31
Contagio-infectious pleuro-pneumonia, 797, 892
Contagious and infectious diseases in animals, 943
diseases (Animals) Act, the, 26, 102, 160, 233, 310, 400, 422, 487, 549, 581, 670, 718, 805, 859
in animals, deputation to the Government, 434
of cattle—Norfolk Report, 131
pleuro-pneumonia, how is it spread? 881
compulsory slaughter in, 895
Consular reports upon agriculture—Turkey, 684
Copenhagen Veterinary School, centenary of the, 377
Cornea, terminations of nerve into, 198
Council, orders in, 276, 555, 701
Cow, hydrops pericardii in a, 573
parturient apoplexy in the, 800
tuberculous deposit associated with sphacelus of the liver of a, 147

Cows, mode of preventing, from sucking themselves or others, 756
Cox, W. A., his communication on contagio-infectious pleuro-pneumonia, 797, 892
compulsory slaughter in, 895
his remarks on the cattle trade, 658
his remarks on firing, 709
his remarks on typhoid influenza, 485
his remarks on lead-poisoning, 579
letter from, relative to students, 560
Cullingworth, C., his notes on a remarkable specimen of tapeworm, 129
Cure of a case of traumatic tetanus, 437
Cysts, dental, 692

D.

Dairies, the effects of the recent fog on the Smithfield show and the London, 32
Death of a veterinary surgeon from glanders, 376
Decomposition of albumin and other nutriments, seat of, 842
leaves by carbonic acid, 906
Dental cysts, 692
Deposit, cancerous, in the eye of a horse, 308
tuberculous, associated with sphacelus of the liver of a cow, 147
Development of an unarmed tapeworm in the horse, 617
Different agents affect the secretion of bile, how, 162
Diffused struma, with extensive adhesive attachments, 153
Digestibility, influence of the addition of fat to the food for its, 133
of the fat of hay, 163
Disease of the vertebræ, case of, 151
parasitic, in a chicken, 372
scrofulous, in lambs, 466
the American horse, 28
the grouse, 925
variation of hæmoglobin in, 31
Diseases of cattle, 464, 546, 548
discussion on the, 456
at Natal—redwater, 734
foot-and-mouth, 103, 161, 233, 312, 341, 423, 488, 545, 583, 671, 807
contagious and infectious, in animals, 943
in animals, deputation to the Government, 434
of cattle, contagious—Norfolk report, 131
the Contagious (Animals) Act, 26, 102, 160, 233, 310, 400, 422, 487, 549, 581, 670, 718, 805, 859
Disinfectants, on the right use of, 37
Dislocations, compound, of the fetlock-joint, recovery, 412
Disposal of the carcases, compulsory slaughter of cattle affected with pleuro-pneumonia, and the, 107
Dog, worms in the heart of a, 235
Domain of forensic chemistry, experiments in the, 106
Domestic animals, leucocythæmia in, 674
Dorrofield, W., his obituary, 768
Duranté on the terminations of nerves into the cornea, 198

E.

Effects of fresh choleriac excretions on animals, the, 33
nitrous oxide on germination, 488
the recent fog on the Smithfield show and the London dairies, 1, 32
Empiricism, repression of, 216
Entozoa, revised list of, 296, 472, 643, 887
Entrance of students at the College, letter respecting the, 560
Epidemic, fatal, among ponies, 314, 403
Epizootic influenza among horses in America during 1872-73 (*with map*), 28, 357, 492, 588
Equine parasite, larva of the helophilus, an, 10
Errata, 144, 464, 704, 880, 944
Essay on the action of medicine, 56
Etiology of chronic roaring, 756
Eucalyptus globulus, 848
Ewe's milk, analysis of, 838
Exanthema, coïtal, in horses, 757
Excretions, the effects of fresh choleraic, on animals, 33
Excursions, botanical, 461, 557
Experiments, blood-poisoning, 5, 88, 234
in the domain of forensic chemistry, 106
on the action of different chemical agents on the hæmatopinus vituli (louse of calf), 21
with the scolex of tænia mediocanellata, 368
viper-poison, 248
Expulsion of tapeworm, 440
Extension of rabies, the geographical, 633
Extensive adhesive attachments, diffused struma, with, 153
complications in a mare, comminuted fracture of the pelvis with, 22

F.

Fatal epidemic among ponies, 314, 403
Farmers' Club, 241, 325
Fat of hay, digestibility of the, 163
to the food on its digestibility, influence of the addition of, 133
Fearnley, Principal, resignation of, Edinburgh Veterinary College, 557
Feet, treatment of young horses, 712
Fermentation, butyric, 907
of milk, on the normal microzymas of that liquid as the cause of the spontaneous coagulation, and of the alcoholic, acetic, and lactic, 30
Fetlock-joint, compound dislocations of the, recovery, 412
Field, W., jun., records cases of poisoning in horses, 646
chemical analysis, by Professor Tuson, 648
Firing, on, 709
Fitzwygram's, Sir F., prizes, New Veterinary College, Edinburgh, 463
Flasks, so-called zinc caps for, 236
Fleming, G., his analysis of the continental journals
experiments with the scolex of tænia mediocanellata, 368
parasitic disease in a chicken, 372

Fleming, G., his new variety of spiroptera in poultry, 374
hippophagy, 375
a king's tribute to a veterinary professor's worth, 376
death of a veterinary surgeon from glanders, 376
the centenary of the Copenhagen Veterinary School, 377
cure of a case of traumatic tetanus, 437
osteoporosis, 438
expulsion of tapeworm, 440
Hertwig's fiftieth professional anniversary, 440
Veterinary Institute of Vienna, 441
note on the development of a small unarmed tapeworm in the horse's intestine, and on the serious consequences resulting therefrom, 617
dental cysts, 692
transmission of tinea favosa by a cat and rat, 699
remarks, University of Brussels, 754
army veterinary surgeons during war, 754
contribution to the etiology of chronic roaring, 755
an efficacious mode of preventing cows from sucking themselves or others, 756
coïtal exanthema in horses, 757
veterinary science in Japan, 757
phenate of ammonia, 758
the bite of the skunk, 759
rabies in New York, 759
protective inoculation for bovine contagious pleuro-pneumonia, 927
his lecture on rabies, 606
his memorial to Bourgelat, 145
his notice of Schweinfurth's 'Heart of Africa,' 289
his remarks on "harmless mad dogs," 416
on the geographical extension of rabies, 633
on the spread of contagious pleuro-pneumonia, 881
on the transmissibility of tuberculosis, 917
reports a case of recovery from compound dislocation of the fetlock joint, 412
Flocks, changes which they undergo from external causes, 821
Fœtal ass, congenital hydrocephalus in a, 417
foal, hydrocephalus in a, 481
Fog, on the Smithfield show and the London dairies, the effects of the recent, 1, 32
Food, on its digestibility, influence of the addition of fat to the, 133
Foot-and-mouth complaints of cattle and other animals, with remarks on the general characters of the disease, and the causes which led to its recent extensive prevalence in this kingdom, on, 109, 179, 341
Foot-and-mouth disease, 103, 161, 233, 312, 341, 423, 488, 545, 583, 671, 807
Forage, influence of, on the composition of the bones, 528
Foreign cattle, importation of, 631
Forensic chemistry, experiments in the domain of, 106
Formation of lymph, 315
Fracture, comminuted, of the pelvis, with extensive complications, in a mare, 22
of the parietal bones in a horse, 66
France, horse-breeding establishments in, 203
veterinary surgery in, 424

Freiburg works, influence of the smoke from the, 236
French military horses, German *v.*, 28
Fresh choleraic excretions on animals, the effects of, 33
Functions of the sensory and motor nerves, on the, 857
Fund, Royal College of Veterinary Surgeons, 71, 139, 286, 447, 461, 877
Further remarks on rare parasites from the horse, 217

G.

Genealogy of the horse, 257
Geographical extension of rabies, the, 633
German *v.* French military horses, 28
Germany, trichinosis in, 522, 906
Germination, effects of nitrous oxide on, 488
Gerrard, John, his notes on a case of pelvic hæmatocele, 475
observations on parturient apoplexy in the cow, 800
records a case of parturient apoplexy ? in a mare, 566
remarks on parturient apoplexy in the mare, 713
remarks on the action of ranunculaceæ on the horse, 654
Giant puffball, poisoning by the, 584
Gases through colloidal membranes of vegetable origin, passage of, 105
Glanders, 312
death of a veterinary surgeon from, 376
Glands, histology of the sudoriparous, 104
Goat's milk, analysis of, 838
Greene, H. P., records three cases of lead-poisoning in horses, 93
Greve on the act of vomiting, 852
Grey, C. J., his obituary, 944
Grouse-disease, the, 925
Growth of longbones, artificial arrest of, 489

H.

Haddon, J., M.D., on the present treatment of bites by dogs, 912
Hæmatocele, pelvic, case of, 475
Hæmatopinus vituli (louse of calf), experiments on the action of different chemical agents on the, 21
Hæmoglobin in disease, variation of, 31
"Harmless mad dogs," 316, 416
Harpley, J., his remarks on the Juries' Bill, 304
Hart, R. Spooner, his observations on parasites from the horse and other animals, 786
remarks on parasitism, 666
Hasse on transfusion of lamb's blood into man, 366
Hay, digestibility of the fat of, 163
Heart of a dog, worms in the, 235
'Heart of Africa,' Schweinfurth's, 289
Helophilus, an equine parasite, larva of the, 10
Herds, changes which they undergo from external causes, 821
Hertwig's fiftieth professional anniversary, 440
Hill, J. W., his remarks on the use of the actual cautery, 533
Hippophagy, 375, 672
Histology of the sudoriparous glands, 104

Hofmeister, V., on the influence of the addition of fat to the food on its digestibility, 133.
Holmes, Robert Martin, his obituary, 288
Horned cattle, brittleness of the bones in, 30
Horse, action of ranunculaceæ on the, 654
breeding establishments in France, 203
development of an unarmed tapeworm in the, 617
disease, the American, 28, 357, 492, 588
fracture of the parietal bones in a, 66
genealogy of the, 257
institutions of France and other European countries, 427
observations on rare parasites of the, 81
parasites from the, observations on, 786
successful treatment of chronic rheumatism in the, 307
subacute paraplegia in the, 575
the pathology of vertigo in the, 17
cases of poisoning in, 646
post-mortem, by Mr. Milnes, 647
chemical analysis, by Professor Tuson, 648
coïtal exanthema in, 757
Horses' feet, treatment of young, 712
German *v.* French military, 28
importation of, from the Argentine, 424
in America, epizootic influenza among, during 1872-3 (*with map*), 28, 357, 492, 588
names for, 80
narcotising, 807
prevention of tormenting, by flies, 29
the Paris Omnibus Company, and its knocked-up, 29
the supply of, 463
three cases of lead-poisoning in, 93
Howard, J., his remarks on comminuted fracture of the pelvis, with extensive complications in a mare, 22
How different agents affect the secretion of bile, 162
the contagious pleuro-pneumonia of cattle is spread, 881
to kill mites, ticks, and lice affecting the lower animals, 98
Hughes, J., his obituary, 768
Hungary, legislation in, for the suppression of the cattle plague in, 253
Hunting field, accident in the, 79
Husk in calves, 24
Hydrate, chloral, and camphor, 720
Hydrocephalus, congenital, in a fœtal ass, 417
in a fœtal foal, 481
Hydrochloric acid, the purification of, 31
Hydrogen as a laboratory re-agent, new process for the preparation of sulphuretted, 04
Hydrophobia, regulations relating to gift by J. Reilly, Esq., for research into the nature and treatment of, 867
and rabies, 164, 314
Hydrops pericardii in a cow, 573
Hypertrophy and acute inflammation of the kidney, 100
Hypodermic injections, iodic acid in, 105
use of atropine in traumatic tetanus, 908

I.

Importation of foreign cattle, 631
of horses from the Argentine, 424
of Irish cattle, 549
Improvements in toxicological investigations, 853
Inaugural address, Royal Veterinary College, 769
India, report on parasites from, 788
Infectious diseases in animals, 943
Inflammation of the kidney, hypertrophy and acute, 100
Influence of forage on the composition of the bones, 528
of smoke from the Freiburg works upon the neighbouring vegetation and the health of domesticated animals, 236
of the addition of fat to the food on its digestibility, 133
Influenza, epizootic, among horses in America during 1872-3 (*with map*), 28, 357, 492, 588
typhoid, 485
Injections, iodic acid in hypodermic, 105
parenchymatous, of carbolic acid, 908
Inoculations, smallpox, 720
Inspection, cattle, and the police, 237
of the ports, 317
Inspectors, port, appointment of, 767, 944
Institute, Veterinary, of Vienna, 441
Intelligence, parliamentary, 545, 546, 548, 549, 631
Intestinal calculi, specimen of, 891
Iodic acid in hypodermic injections, 105
Iodine, mode of action of, 193
Irish cattle diseases acts, 399
importation of, 549
Iris, Vulpian on the nerves of the, 424

J.

Jackson, J. R., his notes on the areca palm, 250
Japan, veterinary science in, 757
Jarvis, H., his remarks on hypertrophy and acute inflammation of the kidney, 100
records cases of husk in calves, 24
reports a case of successful treatment of chronic rheumatism in the horse, 307
Jubilee, Professor Straube's, 235
Juries' Bill, the, remarks on, 304

K.

Kent, W. H., his obituary, 880
Kidney, hypertrophy and acutc inflammation of the, 100
Kidneys, anatomy and physiology of the, 200
Kill, mites, ticks, and lice affecting the lower animals, how to, 98
King's, a, tribute to a veterinary professor's worth, 376
Knocked-up horses, the Paris Omnibus Company, and its, 29

L.

Laboratory reagent, new process for the preparation of sulphuretted hydrogen, as a, 104
Lactic fermentation of that liquid, on the normal microzymas of milk as the cause of the spontaneous coagulation, and of the alcoholic, acetic, and, 20
Lamb's blood into man, transfusion of, 366
Lambs, scrofulous disease in, 465
Landois on transfusion with the blood of different kinds of animals, 683
Larva of the helophilus, an equine parasite, 10
Lead, action of air and water upon, 800, 809
poisoning in cattle (belland), 579
in horses, three cases of, 93
Leaders:
The effects of the recent fog on the Smithfield show and the London dairies, 32
Compulsory slaughter of cattle affected with pleuro-pneumonia, and the disposal of the carcases, 107
Rabies and Hydrophobia, 164
Cattle inspection and the police, 237
"Harmless mad dogs," 316
Inspection at the ports, 317
Parasitism in Australia, 318
The Annual Meeting of the Royal College of Veterinary Surgeons, 425
Government inspectorships, 427
Examination of candidates for the office of port inspectors, 490
On ventilation, 585
Appointment of port inspectors, 586
The opening of the session, 673
The contagious nature of pleuro-pneumonia, 722
The grouse disease, 725
Compulsory slaughter in pleuro-pneumonia, 812
The contagious nature of pleuro-pneumonia, 909
Parasitism in America, 911
Leaves, decomposition of, by carbonic acid, 906
Lecture on rabies, 606
Legislation in Hungary for the suppression of the cattle plague, 253
Lepper, Henry, his obituary, 632
Letheby, Dr., on the right use of disinfectants, 37
Letter from Mr. W. A. Cox, relative to students, 560
Leucocythæmia in domestic animals, 674
Lice affecting the lower animals, how to kill, 98
Lime water, use of, in stings of bees or wasps, 236
Lip, termination of nerves in the, 104
List, revised, of entozoa, 296, 472, 643, 887
Litmus, reaction of milk, 855
Litt, W. E., his treatment of subacute paraplegia in the horse by the use of stryehnia, 575
Live stock in South Australia, 201
Liver, atrophy of the, case of, 221
of a cow, tuberculous deposit associated with sphacelus of the, 147
London dairies, the effects of the recent fog on the Smithfield show and, 1, 32
Longbones, artificial, arrest of growth of, 489

Lord, W. C., his obituary, 632
Louse of a calf, experiments on the action of different chemical agents on the hæmatopinus vituli, 21
Lowe, J., his obituary, 944
Lower animals, how to kill mites, ticks, and lice, affecting the, 98
Lymph, formation of, 315

M.

McDonnell on the torsion of blood-vessels, 850
Macgillivray, A. E., his directions how to kill mites, ticks, and lice affecting the lower animals, 98
reports a case of diffused struma, with extensive adhesive attachments, 153
Madder feeding, colouring of bones through, 844
Malcolm, J., records a case of hydrops pericardii in a cow, 573
Marcet on the nutrition of animal tissues, 858
Mare, parturient apoplexy in a, 768
parturient apoplexy? in a, 566
in the mare, 713
March, James, his obituary, 464
Materia medica, for the use of practitioners and students of veterinary medicines, a pharmacopœia, including the outlines of, second edition, 167
Mavor, Mr., his essay on the action of medicines, 56
Meat, Australian, 587
Medicine, pharmacopœia for the use of students in veterinary, second edition, 167
Medicines, on the action of, 56
veterinary, their actions and uses, fourth edition, 165
Mégnin's tapeworm, remarks on, 640
Megrims, remarks on, 230
Members, new, of the profession, 73, 146, 397, 879
Membranes of vegetable origin, passage of gases through colloidal, 105
Memorial to Bourgelat, a, 145
Merino sheep, changes in South Africa, through the, 815
Method, handy, of examining nervous tissues microscopically, 751
Meyrick, J. J., his remarks on "Seedy Foot," 711
his treatment of young horse's feet, 712
Michelson on transference of ringworm from a cat, 682
Microscope, a new portable, 401
Microscopic characters of dust, 197
Microzymes of milk, as the cause of the spontaneous coagulation, and of the alcoholic, acetic, and lactic fermentation of that liquid, normal, 30
transformation of, into bacteria in the alimentary canal of animals, 235
Milk, ewe and goat's analysis of, 838
its supply and adulteration, 241, 325
the normal microzymes of, as the cause of the spontaneous coagulation, and of the alcoholic, acetic, and lactic fermentation of that liquid, 30
reaction of, with litmus, 855
Military horses, German *v.* French, 28

Mites, ticks, and lice affecting the lower animals, how to kill, 98
Mode in which bacteria multiply, the, 163
of preventing cows from sucking themselves or others, 756
Morphia suppositories in veterinary practice, subcutaneous application of, 26
Motor powers, animals as, 808
Multiply, mode in which bacteria, 163
Mulvey, H. J., reports a case of cancerous deposit in the eye of a horse, 308
Murch, J., his obituary, 464
Murray, A. J., his experiments on the action of different chemical agents on the hæmatopinus vituli (louse of calf), 21
his remarks on the pathology of vertigo in the horse, 17
Muscles of the rabbit and ray, red and pale, 161

N.

Names for horses, 80
Narcotising horses, 807
Natal, appointment of a veterinary surgeon at, 767
cattle disease at, 734
Nature of bleaching powder, 810
Nerves in the lip, termination of, 104
of the iris, Vulpian on the, 424
on the junction of the sensory and motor, 857
regeneration of, 246
terminations of, in cornea, 198
Newdegate, Mr., presents the Coleman prize medals, &c., 778
his address at the opening of the College, 779
Newman, S., his remarks on the subcutaneous application of morphia suppositories in veterinary practice, 26
New form of portable microscope, 401
members of the profession, 73, 141, 397, 879
process for the preparation of sulphuretted hydrogen as a laboratory reagent, 104
variety of spiroptera in poultry, 374
Veterinary College, Edinburgh, 287
New York, rabies in, 759
Nicholson, R., his obituary, 632
Nitrogen, atmospheric action of, in vegetation, 721
Nitrous oxide, effects of, on germination, 488
Norfolk, report on contagious diseases of cattle, 131
Normal urine, the presence of bile acids in, 30
microzymes of milk, as the cause of its spontaneous coagulation, 30
Notes on a remarkable specimen of tapeworm, 129
on the areca palm, 250
Nutrition of animal tissues, on the, 858

O.

Observations on bursottee, 791
parasites from the horse and other animals, 7, 296, 403, 472, 640, 693, 786, 887
rare parasites of the horse, 81, 217

Obituary:
Briscoe, B., M.R.C.V.S., 464
Byron, T. A., M.R.C.V.S., 632
Dorrofield, William, M.R.C.V.S., 768
Godwin, George, M.R.C.V.S., 768
Grey, Charles John, M.R.C.V.S., 944
Holmes, Robert Martin, M.R.C.V.S., 288
Hughes, John, M.R.C.V.S., 768
Kent, William Henry, M.R.C.V.S., 880
Lepper, Henry, M.R.C.V.S., 632
Lord, W. C., M.R.C.V.S., 632
Lowe, James, M.R.C.V.S., 944
Murch, James, M.R.C.V.S., 464
Nicholson, R., M.R.C.V.S., 632
Ricketts, Richard, M.R.C.V.S., 768
Rushton, John, M.R.C.V.S., 768
Seaman, Isaac, M.R.C.V.S., 704
Simpson, Andrew, M.R.C.V.S., 704
Small, Matthew, M.R.C.V.S., 144
Watson, Alfred, M.R.C.V.S., 768
Wheeler, James, M.R.C.V.S., 880
Wilkinson, Waller, M.R.C.V.S., 144
Olver, Harry, records a case of congenital hydrocephalus in a fœtal foal, 481
Omnibus Company and its knocked-up horses, the Paris, 29
On absorptiometry, 845
On a handy method of examining morbid nervous tissues microscopically, 751
firing, 709
foot-and-mouth complaints of cattle and other animals; with remarks on the general characters of the disease and the causes which led to its recent extensive prevalence in this kingdom, 109, 179, 341
parturient apoplexy in the mare, 652
purpura hæmorrhagica, 223
the anatomy and physiology of the kidneys, 200
food of stock, and its impurities, 611
mode of action of iodine and its preparation, 193
nature of bleaching powder, 810
normal microzymas of milk, 30
right use of disinfectants, 37
Opening of the session, 673
at the Royal Veterinary College, 769
inaugural address, 769
Ophiological congress, proposed, 248
Orders in council, 276, 555, 704
the pleuro-pneumonia, 862
Organism, animal, combustion in the, 753
Origin, passages of gases through colloidal membranes of vegetable, 105
Osteoclasty of bovine animals, 525
Osteoporosis, 438
'Outlines of Materia Medica for the use of Practitioners and Students of Veterinary Medicine, a Pharmacopœia, including the,' second edition, 167

P.

Pale muscles of the rabbit and ray, Ranvier on red and, 161
Pallin, W., his case of disease of the vertebræ, 151
Palm, notes on the areca, 250
Paton, T., his remarks on vertigo (megrims), 230
Paraplegia, subacute, in the horse, 575
Parasite, larva of the helophilus, an equine 10
Parasites, and the part they play in nature, 168
from the horse and other animals, observations on, 7, 296, 403, 472, 640, 693, 786, 887
from India, report on, 788
of the horse, observations on rare, 81
rare, from the horse, further remarks on, 217
remarks on the classification of animal, 7
Parasitic disease in a chicken, 372
Parasitism, 666
in Australia, 318
Parenchymatous injections of carbolic acid, 908
Paris Omnibus Company, and its knocked-up horses, the, 29
Parliamentary intelligence, 545, 546, 548, 549, 631
Parturient apoplexy ? in a mare, 566
in a marc, 768
in the cow, 800
in the mare, 652, 713
Passage of gases through the colloidal membranes of vegetable origin, 105
Pathology of vertigo in the, 17
Peculiarity, a, of capillary blood, 489
Peech, late Mr., anecdote of, 216
Pelvic hæmatocele, case of, 475
Pelvis, comminuted fracture of the, with extensive complications in a mare, 22
'Pharmacopœia, including the Outlines of Materia Medica, for the use of Practitioners and Students of Veterinary Medicine,' second edition, a, 167
Phenate of ammonia, 758
Pigeon, the carrier, 907
Plague, cattle, 27, 103, 160, 232, 311, 423, 488, 582, 671, 719, 806.
Plant, a poisonous composite, 130
Plants, carnivorous, 846
Pleuro-pneumonia, 27, 103, 160, 312, 423, 719, 806
the orders, 862
and the disposal of the carcases, compulsory slaughter of cattle affected with, 107
how is it spread ? 881
contagio-infectious, 797, 892
slaughter in, 895
'Pocket Conspectus, the Veterinarian's,' 167
Poisoning by the giant puff-ball, 584
experiments, blood, 5, 88, 234
in horses, cases of, 646
post-mortem by Mr. Milnes, 647
chemical analysis, by Professor Tuson, 648
in horses, three cases of lead, 93
lead of cattle (belland), 579

Poisoning by sheep-dipping mixture, 314
supposed, of calves from eating yew, 901
Poisonous composite plant, a, 130
Ponies, fatal epidemic among, 314, 403
Portable microscope, a new, 401
Port inspectors, appointment of, 787, 944
Ports, inspection of the, 317
Poultry, new variety of spiroptera in, 374
Powers, motor, animals as, 808
Powder, bleaching, the constitution of, 523
nature of, 810
Pox of sheep, 28, 103, 285, 720, 807
Practice, subcutaneous application of morphia suppositories in veterinary, 26
'Practitioners and Students of Veterinary Medicines, a Pharmacopœia; including the Outlines of Materia Medica, for the use of,' second edition, 169
Preparation of sulphuretted hydrogen as a laboratory reagent, new process for the, 104
Presentation of a testimonial to Assistant-Professor Axe, 288
Prevention of cows sucking themselves, 756
tormenting horses, &c., by flies, 29
Principles of botany, the, 11, 88, 155, 226, 300, 417, 482, 561, 649, 705, 793, 898
Prize, Coleman, award, 362
Process for the preparation of sulphuretted hydrogen as a laboratory reagent, new, 104
Productive source of ammoniacal salts, a, 721
Professional anniversary, Hertwig's fiftieth, 440
Profession, new members of the, 73, 141, 397, 879
Professor Traube's jubilee, 235
Proposed ophiological congress, 248
Puffball, poisoning by the giant, 584
Purification of hydrochloric acid, the, 31
Purpura hæmorrhagica, on, 223

Q.

Quarter evil, letter on, 275

R.

Rabbit and ray, Ranvier on red and pale muscles of the, 161
Rabies and hydrophobia, 164, 314, 867
in New York, 759
lecture on, 606
Ranunculaceæ, action of, on the horse, 654
Ranvier on red and pale muscles of the rabbit and ray, 161
Rare parasites of the horse, observations on, 81, 217
Rat, tinea favosa from a, 699
Ray, Ranvier on the red and pale muscles of the rabbit, 161
Reaction of milk with litmus, 855
Reagent, new process for the preparation of sulphuretted hydrogen, a laboratory, 104
Recent fog on the Smithfield show and the London dairies, the effects of the, 32

Record of experiments of blood-poisoning, 5, 88, 234
Recovery from compound dislocation of the fetlock-joint, 412
Red-water of cattle, 216
Refreshment trucks, cattle, 144
Regeneration of nerves, 246
Regulations relating to a gift of five hundred guineas offered by J. Reilly, Esq., of Manchester, for the encouragement of research into the nature and treatment of hydrophobia, 867
Rein, the bearing, 865
Remarkable specimen of tapeworm, notes on, 129
Remarks on the Juries' Bill, 304
on Mégnin's tapeworm, 640
on the classification of animal parasites, 7
on seedy foot, 711
on vertigo (Megnin's), 230
Report on the epizootic influenza among horses in America during 1872-3 (*with map*), 357, 492, 588
on parasites from India, 788
Repression of empiricism, 216

Reviews:
'Veterinary Medicines, their Action and Uses,' by Finlay Dun, fourth edition, 1874, 165
'A Pharmacopœia, including the Outlines of Materia Medica, for the use of Practitioners and Students of Veterinary Medicine,' by Richard V. Tuson, F.C.S., second edition, 1874, 167
'The Veterinarian's Pocket Conspectus of Medicinal Agents, and Poisonous and Medicinal Plants, with Doses, Symptoms of Poisoning, Antidotes,' &c., by Thomas Walley, M.R.C.V.S., 1873, 167
'The Specific Action of Drugs on the Healthy System, an Index to their Therapeutic Value, as deduced from Experiments of Man and Animals,' by Alexander G. Burness, M.B., C.M., Univ. Aberd., and F. J. Mavor, M.R.C.V.S., President Central Veterinary Society, 1874, 240
'A Manual of Botany, including the Structure, Functions, Classification, Properties, and Uses of Plants,' by Robert Bentley, M.R.C.V.S., F.L.S., Examiner in Botany to the Royal College of Veterinary Surgeons,' &c., third edition, 1874, 323
'Parasiti Interni degli Anamali Domestici. Manuale degli Entozoi del Bove, della Pecora, del Cane, del Cavallo, del Majale, e del Gatto.' (Traduzione dall' Inglese e Note del Dott. Tommaso Tommasi), 733
'The Student's Guide to Materia Medica in accordance with the latest Issue of the British Pharmacopœia,' by John C. Thorowgood, M.D. Lond., &c., pp. 318, 1874, 814
'Journal of the Chemical Society, containing the Papers read before the Society, and Abstracts of Chemical Papers published in other Journals,' 814

Revised list of entozoa, 296, 472, 643, 887
Ricketts, R., his obituary, 768
Right use of disinfectants, on the, 37
Ringworm, transference of, from a cat and rat, 682, 699
Roaring, etiology of chronic, 755
Royal Agricultural Society of England, 69, 270, 456
College of Veterinary Surgeons' fund, 71, 139, 286, 447, 461, 877
annual meeting, 441

Royal College of Veterinary Surgeons, quarterly meetings of council, 135, 377, 623, 868
Veterinary College, matriculation examinations at the, 397
collegiate monitors, 878
opening of the session, 769
inaugural address, 769
the botanical lectures at the, 461, 557
list of freshmen at the, 879
introductory address, by Prof. Tuson, at the opening of the session, 769
Rushton, J., his obituary, 768

S.

Salts, ammoniacal, a productive source of, 721
Santoninic acid, 809
Santy, A. H., his remarks on two cases of purpura hæmorrhagica, 223
Scab of sheep, 28, 103, 807
School of Copenhagen, centenary of the veterinary, 377
Schorlemmer on the constitution of bleaching powder, 523
Schutzenberger on combustion in the animal organism, 753
Schweinfurth's 'Heart of Africa, 289
Science, veterinary, in Japan, 757
Scolex of tænia mediocanellata, experiments with the, 368
Scrofulous disease in lambs, 465
Seat of decomposition of albumen and other nutriments, 842
Secretion of bile, how different agents affect the, 162
"Seedy foot," remarks on, 711
Sée, Professor, on the mode of action of iodine and its preparations, 192
Session, opening of the, 673
at the Royal Veterinary College, 769
inaugural address, 769
Sheep-dipping mixture, poisoning by, 314
pox, 28, 103, 583, 720, 807
scab, 28, 103, 807
Shipping sheep to Australia, 458
Shortt, Dr., his experiments with viper-poison, 248
Simonds, Professor, his letter on "quarter evil," 275
Skunk, the bite of the, 759
Slaughter, compulsory, in contagious pleuro-pneumonia, 895
of cattle affected with pleuro-pneumonia, and the disposal of the carcases, compulsory, 107
Small, Matthew, his obituary, 144
Smoke from the Freiburg works, influence of, upon vegetation and domesticated animals, 236
Smithfield show and the London dairies, the effects of the recent fog on the, 1, 32
So-called zinc caps for bottles, flasks, &c., 236
Source, a productive, of ammoniacal salts, 721
South Africa, changes in the vegetation of, 815
Specimen of tapeworm, notes on a remarkable, 129
Specimens of intestinal calculi, 891
Sphacelus of the liver of a cow, tuberculous deposit associated with, 147
Spiroptera in poultry, new variety of, 374

Splenic apoplexy, 671
Spontaneous coagulation, and alcoholic, acetic, and lactic fermentation due to the normal microzymes of milk, 30
Statistics of horses, cattle, sheep and pigs for 1873, 202
Stings of bees or wasps, lime-water in, 236
Stock in Australia, 201
on the food of, and its impurities, 611
Struma, diffused, with extensive adhesion, 153
Students, letter respecting the entrance of, at the College, 560
of Veterinary Medicine; a Pharmacopœia, including the Outlines of Materia Medica for the Use of Practitioners and,' second edition, 167
who have passed their first examination, London, 630
Edinburgh, 630
Glasgow, 631
Subacute paraplegia in the horse, 575
Subcutaneous application of morphia suppositories in veterinary practice, 26
Substances of the brain, composition of the grey and white, 29
Successful treatment of chronic rheumatism in the horse, 307
Sucking themselves or others, mode of preventing cows, 756
Sudoriparous glands, histology of the, 104
Sugar and sulphuric acid, action of, on some alkaloids, 584
Sulphuretted hydrogen as a laboratory reagent, new process for the preparation of, 104
Supply and adulteration of milk, 241, 325
of horses, the, 463
Suppositories in veterinary practice, subcutaneous application of morphia, 26
Surgeon, death of a veterinary, from glanders, 376
Surgeons, foreign army veterinary, during war, 754
Surgery, veterinary, in France, 424

T.

Tænia mediocanellata, experiments with the scolex of, 368
Tapeworm, development of an unarmed, in the horse, 617
expulsion of, 440
Megnin's remarks on, 640
notes on a remarkable specimen of, 129
Termination of nerves in the lip, 104
Testimonial, presentation of a, to Assistant-Professor Axe, 288
Tetanus, traumatic, use of chloral in, 908
atropine in, 908
cure of a case of, 437
The action of the ranunculaceæ on the horse, 654
American horse disease, 28, 357, 492, 588
bearing-rein, 865
bite of the skunk, 759
carrier-pigeon, 907
chemistry of the bones, 811
constitution of bleaching-powder, 523
Contagious Diseases (Animals) Act, 26, 102, 160, 233, 310, 400, 422, 487, 549, 581, 670, 718, 805, 859
effects of fresh choleraic excretions on animals, 33

The horse institutions of France and other European countries, 427
Irish Cattle Diseases Acts, 399
Juries' Bill, remarks on, 304
mode in which bacteria multiply, 163
opening of the session at the Royal Veterinary College, 673
Paris Omnibus Company and its knocked-up horses, 29
pathology of vertigo in the horse, 17
pleuro-pneumonia orders, 862
police and cattle inspection, 237
presence of bile-acids in normal urine, 30
grouse-disease, 925
effects of the fog on the Smithfield show and the London dairy cattle, 32
geographical extension of rabies, 633
microscopic characters of atmospheric dust, 197
present treatment of bites by dogs, as being unsound in theory, injurious and unsuccessful in practice, 912
principles of botany, 11, 88, 155, 226, 300, 417, 482, 561, 649, 705, 793
purification of hydrochloric acid, 31
supply of horses, 463
Thursley poisoning case by sheep-dip, 314
transmissibility of tuberculosis, 917
'Veterinarian's Pocket Conspectus of Medicinal Agents, and Poisonous and Medicinal Plants, with Doses, Symptoms of Poisoning, Antidotes,' &c., 167
Three cases of lead-poisoning in horses, 93
Ticks and lice affecting the lower animals, how to kill, 98
Tinea favosa, transmission of, by a cat and rat, 682, 699
Tissues, animal, on the nutrition of the, 858
nervous, handy method of examining microscopically, 751
Tombs, D. H., records supposed cases of poisoning of calves from eating yew, 901
Tormenting horses, &c., by flies, prevention of, 29
Torsion of blood-vessels, on the, 850
Toxicological investigations, improvements in, 853
Trade in cattle, 658
Transformation of bacteria into microzymes and of microzymes into bacteria in the alimentary canal of animals, 235
Transfusion of lamb's blood into man, Hasse on, 366
with the blood of different kinds of animals, 683
Transmissibility of tuberculosis, 917
Transmission of tinea favosa by a cat and rat, 682, 699
Traube, Professor, his jubilee, 235
Traumatic tetanus, cure of a case of a, 437
Treatment of traumatic tetanus by chloral, 908
by atropine, 908
of young horses' feet, 712
successful, of chronic rheumatism in the horse, 307
Trichinosis, 235, 313, 314, 906
Wislicenus on, 522
Trucks, cattle refreshment, 144
Tuberculosis, the transmission of, 917
Tuberculous deposit associated with sphacelus of the liver of a cow, 147
Tuke, J. Batty, on a handy method of examining morbid nervous tissues microscopically, 751

Tuson, Professor, his inaugural address, 769
his lecture on the food of stock, and its impurities, 611
his 'Pharmacopœia, including the Outlines of Materia Medica for the Use of Practitioners and Students of Veterinary Medicine,' second edition, review of, 167
Typhoid influenza, 485

U.

University of Brussels, 754
Urine, the presence of bile-acids in normal, 30
Use of the actual cautery, 533
'Uses and actions of veterinary medicines,' fourth edition, revised, 165

V.

Variations of hæmoglobin in disease, 31
Variety, new, of spiroptera in poultry, 374
Vegetable origin, passage of gases through colloidal membranes of, 105
Vegetation, action of atmospheric nitrogen in, 721
of South Africa, changes in the, 815
Vertebræ, case of disease of the, 151
Vertigo (megrims), remarks on, 230
in the horse, the pathology of, 17
Veterinarian's Pocket Conspectus, the, 167
Veterinary College, Royal, matriculation examinations at the, 397
collegiate monitors, 878
clinical clerks appointed, 879, 944
opening of the session, 769
the botanical lectures at the, 461, 557
list of freshmen at the, 879-880, 944
introductory address by Professor Tuson, 769
Royal College of, Surgeons, funds, 71, 139, 286, 447 461, 764, 877
meetings of council, 135, 377, 529, 623, 868
annual meeting, 441
College, Glasgow, opening of session, 941
Central, Medical Society, 55, 215, 258, 452, 530, 930
Mavor, Mr., his essay on the action of medicines, 56
Edinburgh, Medical Society, 66
L. T. Barker on a case of fracture of the parietal bones in a horse, 66
College, Edinburgh, 287, 702, 935
resignation of Dr. Murie, 79
of Professor Fearnley, 557
graduates, 704
New, 287
Sir F. Fitzwygram's prizes, 463
Lancashire, Medical Association, 211, 268, 629, 931
Liverpool, Medical Association, 208, 455, 700, 932
Midland Counties, Medical Association, 61, 532

Veterinary, Midland Counties, Medical Association, Hill, J. W., his observations on the use of the actual cautery, 533
Scottish Metropolitan, Medical Society, 62, 270, 541, 762
Yorkshire, Medical Society, 259, 454, 761
president's address, 260
surgeon, appointment of a, at Natal, 767
Institute of Vienna, 441
medicines, their actions and uses, fourth edition, 165
a Pharmacopœia, including the Outlines of Materia Medica for the use of Practitioners and Students of,' second edition, 167
practice, subcutaneous application of morphia suppositories in, 26
professor's worth, a king's tribute to, 376
School of Copenhagen, centenary of the, 377
science in Japan, 757
surgeon, death of a, from glanders, 376
surgeons, foreign army, during war, 754
surgery in France, 424

Veterinary jurisprudence:
alleged case of pleuro-pneumonia, Ramsden *v.* Briggs, 74
Falmouth County Court, a case of spavin, Freemans *v.* Gould, 78
a cattle dealer convicted of sending diseased cattle to market, 142
alleged breach of warranty, chronic laminitis, Hutchings *v.* Redman, 213
the sale of in-calf heifers on warranty, Lane *v.* Tough, 278
case of broken wind, Harrison *v.* Cattell, 283
horse-dealing transactions, Cobley *v.* Gregg, 285
pleuro-pneumonia, important meat prosecution, 386
the Edinburgh Veterinary Medical Society, 391
shipping sheep to Australia, 458
action against a railway company for the value of a horse, 878

Viper-poison, experiments with, 248
Vituli (louse of calf), experiments on the action of different chemical agents on the hæmatopinus, 21
Voelcker, Dr. A., his lecture on milk, its supply and adulteration, 241, 325
Vomiting, act of, Greve on the, 852
Vulpian on the junction of sensory and motor nerves, 857
on the nerves of the iris, 424

W.

Walley, T., his remarks on parturient apoplexy in the mare, 652
his 'Veterinarian's Pocket Conspectus,' 167
War, army veterinary surgeons during, 754
Wasps, lime-water in stings of bees or, 236
Water, by animals, consumption of, 31
red-, of cattle, letter from Professor Williams, 216
Watson, A., his obituary, 768
Wheeler, J., his obituary, 880
White substances of the brain, composition of the grey and, 29
Wilkinson, Waller, his obituary, 144
Williams, Professor, his letter on red-water of cattle, 216

Wislicenus on trichinosis, 522
Worms in the heart of a dog, 235

Y.

Yew, supposed poisoning of calves from eating, 901
Young horses' feet, treatment of, 712

Z.

Zinc caps, so-called, for bottles, flasks, &c., 236

DIRECTIONS TO THE BINDER.

Map to face p. 520
Plate, figs. 1 and 2, to face p. 622

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Extract from The Veterinarian, Vol. XLVII-XX. 1874. P. 406.

Dear Sir, - I regret to say that I cannot give you all the particulars respecting the subject of the tape-worms that I would wish, as I have either mislaid or lost the notes I made about November last; however, I will detail to you as much as I can remember. During the last twelve months, mountain ponies grazing on the lower districts of Breconshire, which comprise some of the highest mountains in South Wales, have been dying in great numbers, from what the farmers indefinitely term inflammation. From what I have seen and heard, it appears that there are three causes of death - the tape-worm, the small worms (which I presumed were a kind of strongle), and catarrhal disorders such as have been common among horses of late; by far the greater number of deaths (from what I can glean) have been caused by the parasites. In the Ystradfellte or Penderin districts there has been no investigation, although the disease has reigned there for a longer period, about eighteen months, with (from what I have heard) a larger number of deaths than elsewhere; so I shall let these remain for the present, as I have not had an opportunity to see or hear anything authentic about them. In the Talybont district, the cause appears to be the small worms (like those I sent). The owner of the animals I saw said that a month ago, when he went to look after his ponies, they were appearing quite well, and looked to him as well as he could expect them this season, but was astonished to find some of them a fortnight ago looking very lean and wasting, and he thought that the weather was the cause of it, yet resolved to see them oftener; the next time he saw them one was dead, and knowing of the loss in the neighbourhood, and fearing he would be a sufferer, he sought aid, applying to me. When I arrived two days following, two more were dead, and they presented an emaciated appearance. The post-mortem examination revealed a healthy condition of the whole of the intestines, save slight thickening of some parts of the colon and rectum, which contained enclosed in the mucous membrane in cysts or minute sacs, worms coiled upon themselves. Each cyst containing one worm was best seen by transmitted light. The colon was nearly full of faecal matter, which contained thousands of parasites scarcely visible; the largest of which were very few in number, and those not exceeding an inch in length and barely one sixteenth in diameter at the middle portion. They somewhat tapered at both ends. The caecum was half full of fluid faeces, containing no visible worms; the rectum, with faeces of natural consistence, the examination of which revealed only two or three evident worms; so that the examination of faeces of living animals giving results like this would not assist the diagnosis, unless suspected. Small intestines, these latter contained about a dozen bots, which were nearly free but had pierced to the muscular coat. I should think they had participated in the disease. The right lung had been slightly congested; nothing else abnormal to be seen. Possibly congestion of lungs would arise from the distress when pained with worms, for the pony was found on its back with its head in a thicket. It had not appeared to have struggled with its teeth firmly closed.

Not having been observed very closely, I could not gain much information about these animals, the chief thing noticed being emaciation; sometimes extending the head and wrinkling the upper lip, the appetite being apparently unimpaired. Generally, the Schneiderian membrane was injected as in slight cold, the faeces

having no unusual appearance, and but slight staring coat.

Ordered those affected to be kept in a shed, and prescribed six doses to each, thus:-

℞ Ferri Sulph., ʒ ij;
Gentian. Pulv., ʒ iss;
Zingib. Pulv., ʒ ij;

to be given night and morning; and lastly:-

℞ Liq. Aloes c. Sod. Carb., ℥ iij.,
Pulv. Zingib., ʒ ij.,
Aquae ferv. ad ʒ x;

with instructions to examine dung, and to confine them until the action of the aloes ceases.

Respecting the animals affected with taenia, it is remarkable that as a rule they are in fair condition. The average time they appear to be troubled with the worms is two months, and the symptoms observed have been many. They are at first seen to be unable to keep up with the other ponies; extending the head and turning upper lip up; rubbing the quarters; staring coat; suddenly appearing distracted; seizing turf in mouthfuls when being griped or pained; others runing away as fast as they can go, or then walking away as if nothing had happened; if coming down a slope quickly almost sure to fall headlong; easier caught; not unfrequently coughing; groaning noise; appetite good; and what is peculiar in some of them lameness of one of the hind limbs, mostly near hind leg, with slight knuckling over at fetlock.

Post-mortem appearance:- Abdominal viscera normal, save rectum, which is in some places slightly congested; colon nearly full of faeces; no worms; caecum, in which worms are alone found, is nearly full of faecal matter of thicker consistence than usual, and nearly half made up of worms; stomach half full of partly digested food; heart and lungs healthy; Schneiderian membrane injected; mucous membrane of trachea a nd part of larger bronchiae of a more or less livid colour (which may be owing to asphyxia); corner of tongue bitten off; mouth very close.

Several animals are found at times lying dead together.

Treatment was as follows:

Removal to an open shed and two ounces of the following mixture given every morning, fasting:-

℞ Ol. Filicis maris,
Ol. Absinthii,
Ol. Terebinthinae,
Ol. Lini, āā, ℥ ij;

in gruel, to be followed with ℥ iij of common salt and ʒ ij of Pulv. Zingib. in a pint of tepid water, the last morning fasting. I thought it better to use a saline purgative, thinking it to be safer, as this would also only temporarily deprive them of their liberty.

Lastly, I gave the ferrous sulphate and gentian, with aloes and ginger, which put the animal right. It voided worms and has not been affected since.

I may mention that a couple of dogs at the farm have suffered from Taenia

APPENDIX. Just as I was on the point of forwarding the above remarks to the Editor, I received a third communication from Mr. Rees Lloyd, correcting me in certain points where I had misunderstood the bearing of his statements. Thus, writing on the 8th May, he says:-

"I think that I may not have made a clear explanation respecting the tape-worms in my report to you, as I find (in the Field, April 25th, and the Veterinarian, for May) that you consider the tape-worms as subsidiary to the strangles in causing death. The ponies affected with tape-worms are in a district six or seven miles distant from those affected with strangles. Those troubled with tape-worms are in good condition, as a rule, up to death; they are noticed to be troubled generally for two months previously to death, and may be seen at one hour grazing and apparently well, and dead or dying the next hour. As many as four have been found dead at the same spot. In this (the Beacons) district the tape-worms alone have been found and not a single strongle.

"In the Deangunid district strongles only have been found, such as I sent you. The ponies have been noticed ailing for three or four weeks; becoming rapidly emaciated and dying from exhaustion.

"In tape-worm-affected animals the caecum is nearly half full of these parasites. The animals thus affected are on the red-sandstone formation, whilst those affected with strangles occur on the limestone formation - the latter affording the drier situation."

These additional facts certainly prove the truth of the position taken up by Mr. Lloyd as to the injurious nature of the perfoliate tape-worm, even when not known to be associated with strongles. Having received both kinds of parasites together, I naturally concluded that, as frequently happens in the grouse disease the two causes of fatality had co-operated; and I had good a priori grounds for giving the strongles their unenviable preference in this matter. In certain cases of equine parasitism, already published, this association of strongles and tape-worms has been freely demonstrated, and it is of frequent occurrence in other domesticated animals.

I am particularly glad that I have now the authority of an experienced veterinary practitioner to testify to the injuriousness of Taenia perfoliata in the horse. Over and over again I have pointed out to the members of my class and to others the desirability of examining the faeces of solipeds where obscure symptoms of intestinal irritation existed. Not only so; I have written out prescriptions in the class-room and (at the request of medical friends) have prescribed for equine patients suffering from tape-worm. I am the more indebted to Mr. Lloyd inasmuch as his practical views serve to strengthen several propositions I have advanced in connection with internal parasites as a frequent cause of epizootics. Mr views have been criticised with a vigour and warmth well worthy of those who are afraid of advancing epidemiological science too rapidly; but it seems that so far from my having over stepped the bounds of moderation in this matter, I have, in reality, been almost too cautious. In the particular case of the grouse murrain, my views have been ridiculed by persons who had no knowledge of the parasite, to the injurious action of which I attributed the epidemic.

serrata, and that a few doses of the oleaginous mixture put them right.

Of the Taenia as many as three or four ponies have been found dead on the same spot, which some hours previous had been seen grazing unaffected; and this to my own knowledge, one farmer having lost ten.

Of the small worms I have been told by a farmer that in his district one of his neighbours had lost twelve ponies.

I thought of sending the tape-worms to you some time ago, but I wished to say more about them, as I had noticed your appeal in the Veterinarian for specimens of parasites. Further, I thought they would be of interest, as I noted in your recently published work on the 'Internal Parasites of Domestic Animals' that they did not produce serious results.

Mr. Gamgee mentions that they are only found in the small intestines, whereas the situation I found them in was the caecum.

With reference to the strongles I shall try to make further investigations.

It, therefore, only now remains for me to add that I am sorry I have been unable to send these particulars sooner.

Yours very truly,
REES LLOYD.

The author of the foregoing very practical remarks mayrest assured that not only myself but many membersof the veterinary profession are much indebted to him for the trouble he has taken to collect and record them. It will be seen that in the main, our opinions are in harmony, but that as regards the immediate production of the disease Mr. Lloyd lays more to the charge of the tape-worms than I had been disposed to do. As Mr. Lloyd's conclusions are based on s omewhat unusual and carefully observed data I have no hesitation in accepting his view of the matter. It is becoming more and more apparent e very day that particular species of internal parasites which have all along been regarded as harmless are in reality hurtful, if not absolutely dangerous; and, in this connection, I apprehend that Mr. Lloyd's statements in respect of the Taenia perfoliata demonstrate that this common form of equine tapeworm proves no exception to the rule. I deem it a little unfortunate that my receipt of Mr. Lloyd's important communication came too late to enable me to insert some more extended notice touching the leaf-shaped tape-worm in the 'Revised List of Entozoa,' commenced in the previous number of this journal. That list will be continued from time to time, and form the basis, I trust, of a much more extended revision of the parasitic fauna of domesticated animals.

In regard to the strongles (S. tetracanthus) I have made careful microscopic investigations and have satisfied myself respecting several doubtful points of anatomical structure. I must, however, leave these details for consideration elsewhere; at the same time, expressing not a little regret that it is practically impossible to find time to do full justice to the many helminthic contributions I receive both from England and abroad.

From the evidence which Mr. Lloyd has supplied it can now no longer be said that "the symptoms created by tape-worms in the horse are of little or no consequence." Here, therefore, we have made a clear advance in our knowledge of helminthic disease; and from the impulse thus given to hippopathology it is only reasonable to look for still further advance in veterinary medicine. By and by, the scepticism which not unnaturally exists in reference to entozoa as a frequent cause of death amongst animals, will be displayed by yet clearer enunciations regarding the important part these parasites play in the destruction of our most valuable creatures.

I have not time, at present, to enlarge futher upon this interesting topic, but I am already in possession of facts which tend to prove that a large number of solipeds annually perish in Europe from internal parasites; the chief cause of this mortality being due to an entozoon totally distinct from either of the above-mentioned helminths.

Lastly, in this connection, I embrace the opportunity of thanking Mr. W. R. Bryan, M.R.C.V.S., of Londonderry, for some interesting specimens of palisade strongles which had occasioned the death of a mare, as he himself informed me in a communication received on the IIth ultimo. I am in hopes that notes of the case will shortly be published.

My acknowledgements are also due to Mr. Charles Gray, M.R.C.V.S.,of Kibworth, Leicester, for other parasites.

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WM. LLOYD.